2013

COST TRENDS REPORT

HEALTH POLICY COMMISSION

2013 COST TRENDS REPORT

Pursuant to M.G.L. c. 6D, § 8(g)

Annual Report

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Index of Acronyms

Acronym	Full Name
ACO	Accountable Care Organization
AGO	Office of the Attorney General
AHA	American Hospital Association
AHRQ	Agency for Healthcare Reach and Quality
AMC	Academic Medical Center
AMI	Acute Myocardial Infarction
APCD	All-Payer Claims Database
APM	Alternative Payment Method
BCBS	Blue Cross Blue Shield of Massachusetts
BLS	Bureau of Labor Statistics
BRFSS	Behavioral Risk Factor Surveillance Survey
BUMC	Boston University Medical Center
CAH	Critical Access Hospital
CCTP	Community-based Care Transitions Program
CDC	Centers for Disease Control and Prevention
CDHP	Consumer-Driven Health Plan
CHART	Community Hospital Acceleration, Revitalization, and Transformation Grant
CHIA	Center for Health Information and Analysis
CMIR	Cost and Market Impact Review
CMMI	Center for Medicare & Medicare Innovation
CMS	Centers for Medicare & Medicaid Services
DPH	Massachusetts Department of Public Health
DSH	Disproportionate Share Hospital
DSTI	Delivery System Transformation Initiatives
ED	Emergency Department
ERG	Episode Risk Group
FCHP	Fallon Community Health Plan
FFS	Fee-For-Service
GAF	Medicare Geographic Adjustment Factor
GME	Graduate Medical Education
HAI	Health Care-Associated Infection
HDHP	High-Deductible Health Plan
HEDIS	Healthcare Effectiveness Data and Information Set
HF	Heart Failure
HMO	Health Maintenance Organization
HPC	Health Policy Commission
HPHC	Harvard Pilgrim Health Care
HRR	Hospital Referral Region
ICSI	Institute for Clinical Systems Improvement
ICU	Intensive Care Unit
IHI	Institute for Healthcare Improvement
KFF	Kaiser Family Foundation
MedPAC	Medicare Payment Advisory Commission
MEPS	Medical Expediture Panel Survey
MGL	Massachusetts General Laws
MHQP	Massachusetts Health Quality Partners
NCQA	National Committee for Quality Assurance
NICU	Neonatal Intensive Care Unit
NPSR	Net Patient Service Revenue
OECD	Organization for Economic Co-operation and Development
POS	Point-of-Service
P.P.	Percentage Point
PCMH	Patient Centered Medical Home
PCP	Primary Care Provider
PCPR	Primary Care Payment Reform
PHC	Personal Health Care Expenditure
PN	Pneumonia
PPO	Preferred Provider Organization
RED	Re-Engineered Discharge
RPO	Registered Provider Organizations
SIM	State Innovation Model
SQAC	Statewide Quality Advisory Committee
SQMS	Statewide Quality Measure Set
STAAR	State Action on Avoidable Rehospitalizations
TDABC	Time-Driven Activity-Based Costing
THCE	Total Health Care Expenditures
THP	Tufts Health Plan
TME	Total Medical Expense

Executive Summary

Per capita health care spending in Massachusetts is the highest of any state in the United States, with higher spending than the national average across all payer types. Massachusetts devoted 16.6 percent of its economy to personal health care expenditures in 2012, compared with 15.1 percent for the nation. Higher spending results from higher utilization and higher prices, and is concentrated in two categories of service: hospital care and long-term care and home health.

Over the past decade, Massachusetts health care spending has grown much faster than the national average, driven primarily by faster growth in commercial prices. While spending growth in Massachusetts since 2009 has slowed in line with slower national growth, sustaining lower growth rates will require concerted effort. Past periods of slow health care growth in Massachusetts and the United States, such as the 1990s, have been followed by sustained periods of higher growth.

Massachusetts has better overall health care quality performance and offers better access to care than many other states. However, considerable opportunities remain to further improve quality and access as well as population health.

Significant trends are occurring in the provider and payer market. For providers, the delivery system is growing increasingly concentrated in several large systems, with a larger proportion of discharges occurring from major teaching hospitals and hospitals in their systems. Further, many provider organizations seek to re-orient care delivery around patient-centered, accountable care models, though significant challenges such as misaligned payment incentives, persistent barriers to behavioral health integration, and limited data and resources remain.

In the payer market, insurance companies are offering and purchasers are increasingly selecting products intended to involve consumers in making higher-value decisions, such as choosing high-quality, lower-priced providers and avoiding unnecessary services. With these changes, the proportion of costs covered by insurance benefits has declined.

In addition, public and commercial payers are increasingly developing alternative payment methods that aim to alter supply-side incentives. However, there are significant challenges in implementation, including wide variation in these types of contracts covering Massachusetts providers, both within and across payers, as budget levels, risk adjustments, and other terms are negotiated. In addition, behavioral health services are often excluded from global budgets. Finally, an increasing shift in the commercial market to PPO products, which currently do not support alternative payment methods, presents an obstacle to the continued adoption and potential effectiveness of these payment methods.

To identify potential opportunities for savings in Massachusetts, we reviewed three cost drivers in depth: hospital operating expenses, wasteful spending, and high-cost patients.

Hospital operating expenses

There are major opportunities to improve operating efficiency in Massachusetts hospitals. The operating expenses that hospitals incur for inpatient care differ by thousands of dollars per discharge, even after adjusting for regional wages and the complexity of care provided. Some hospitals deliver high-quality care with lower operating expenses, while many higher-expense hospitals achieve lower quality performance.

Operating expenses are driven in part by market dynamics. Hospitals that are able to negotiate high commercial rates have high operating expenses and cover losses they may experience on public payer business with income from their higher commercial revenue, while hospitals with more limited revenue must maintain lower expenses. Hospitals can follow various strategies to reduce operating expenses, such as adopting "lean" management principles and improving their procurement and supply-chain management processes.

Wasteful spending

An estimated 21 to 39 percent ($14.7 to $26.9 billion in 2012) of health care expenditures in Massachusetts could be considered wasteful. There are specific examples of wasteful spending that payers and providers can address, either in the current fee-for-service system or under alternative payment methods. Large opportunities across care settings include $700 million in preventable acute hospital readmissions and $550 million in unnecessary emergency department visits. Hospitals could reduce health care-associated infections, estimated at $10 to $18 million. Finally, there are a number of opportunities addressable by individual physicians and patients, such as early elective inductions ($3 to $8 million) and inappropriate imaging for lower back pain ($1 to $2 million).

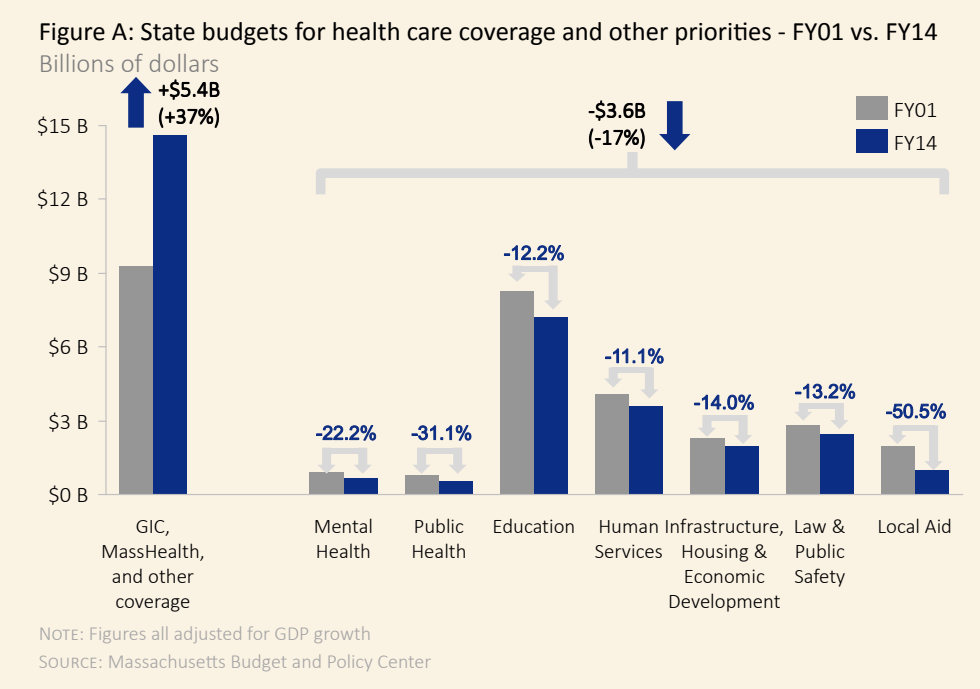
High-cost patients

Five percent of patients account for nearly half of all spending among the Medicare and commercial populations in Massachusetts. Significant savings can be captured by focusing on a subset of the population with identifiable and predictable characteristics. Certain clinical conditions, regions of residence, and demographic characteristics differ between high-cost patients and the rest of the population. A number of conditions occurred more often among high-cost patients, and high-cost patients generally had more clinical conditions than the rest of the population. The presence of multiple conditions, such as behavioral health and chronic medical conditions, increased spending more than the combined effects of individual conditions, illustrating the complexity of managing multiple conditions simultaneously. There was modest regional variation in the concentration of high-cost patients. Socioeconomic factors were also important, as lower zip code income correlated with being high-cost among the commercial population.

Persistently high-cost patients – those who remain high-cost over multiple years – are easier to identify for care improvement and better health outcomes. These patients represent 29 percent of high-cost patients and make up 15 to 20 percent of Medicare and commercial spending in Massachusetts. Interventions that have been shown to improve the efficiency of care for high-cost patients include: prevention of conditions that often lead to expensive health crises; process and operational improvements that reduce the cost of episodes that are common among high-cost patients; and care management resources to support patients to manage their care more effectively and better coordinate care for patients across multiple provider settings.

Introduction

Massachusetts is a national leader in innovative and high-quality health care, but the rising costs of the current system pose an increasing burden for households, businesses, and the state economy. Nationally, health care spending has grown faster than the economy nearly every year over the last four decades. In Massachusetts, the growth has been even more pronounced, with spending on personal health care services increasing from 12.8 percent of the state economy in 2001 to 16.6 percent in 2012.



This level of growth creates an unsustainable crowding-out effect for households, businesses, and government, reducing resources available to spend on other priorities. Households have faced a growing financial burden, with employee contributions for family health insurance plans increasing seven percent annually from 2005 to 2011, while household income rose by only 1.6 percent annually during that same time period.[1,2,3] For businesses, even with the increased shift of costs to employees, a 2012 survey found that 98 percent of Massachusetts companies cited health insurance as their top benefit concern.[4] The rising cost of health benefits places significant pressure on businesses and impedes job and wage growth.[5] For state government in Massachusetts, growth in health care spending has compressed other critical budget priorities (**Figure A**).[i,6] The same is true at the municipal level.[7]

Given these trends, Chapter 224 of the Acts of 2012, Massachusetts' landmark health care cost-containment law, sets a statewide benchmark for the rate of growth of total health care expenditures.[ii] Aiming for sustainable growth, the benchmark is set at the growth rate of potential gross state product for a five-year period from 2013 to 2017 and then to 0.5 percentage points below that figure for the following five years.[iii]

The Health Policy Commission (Commission) is required by law to publish an annual report tracking the health care industry's efforts to meet the statewide growth benchmark while identifying opportunities for improvement in cost, quality, and access (see sidebar **"What is the role of the Health Policy Commission?"**).

The annual report is informed by the annual reports of the Office of the Attorney General (AGO) and the Center for Health Information and Analysis (CHIA) as well as by testimony and reports submitted at the Commission's Annual Cost Trends Hearings. The report serves to inform the activities of the Commission, as well as other policy development in Massachusetts. In this inaugural report, we: (1) analyze Massachusetts health care expenditures, in terms of both levels of spending and yearly changes, through a profile of health care in the Commonwealth; and

[i] State-funded health benefits include coverage provided through the Group Insurance Commission, MassHealth, Commonwealth Care, Health Safety Net, and other health care spending line items.

[ii] Total health care expenditures are defined in Chapter 224 as "the annual per capita sum of all health care expenditures in the Commonwealth from public and private sources, including: (i) all categories of medical expenses and all non-claims related payments to providers, as included in the health status adjusted total medical expenses reported by the Center under subsection (d) of section 8 of chapter 12C; (ii) all patient cost-sharing amounts, such as, deductibles and copayments; and (iv) the net cost of private health insurance, or as otherwise defined in regulations promulgated by the Center."

[iii] The growth rate of potential gross state product is defined in Chapter 224 as the long-run average growth rate of the state's economy, excluding fluctuations due to business cycles.

What is the role of the Health Policy Commission?

The Health Policy Commission (Commission) was established in 2012 through Massachusetts' landmark health care cost-containment law, Chapter 224: "*An Act Improving the Quality of Health Care and Reducing Costs through Increased Transparency, Efficiency, and Innovation.*" The Commission is an independent state agency governed by an 11-member board with diverse experience in health care.

Chapter 224 sets the ambitious goal of bringing health care spending growth in line with growth in the state's overall economy. The Commission is working to advance this goal by:

- Fostering reforms to the health care payment system that aim to reward quality care, improve health outcomes, and more efficiently spend health care dollars;
- Promoting innovative delivery models that will enhance care coordination, advance integration of behavioral and physical health services, and encourage effective patient-centered care;
- Investing in community hospitals and other providers to support the transition to new payment methods and care delivery models;
- Increasing the transparency of provider organizations and assessing the impact of health care market changes on the cost, quality, and access of health care services in Massachusetts;
- Analyzing and reporting of cost trends through data examination and an annual public hearing process to provide accountability of the health care cost-containment goals set forth in Chapter 224;
- Enhancing accountability through the implementation of performance-improvement plans for certain providers and payers that threaten the ability of the state to meet the cost growth benchmark;
- Evaluating the prevalence and performance of initiatives aimed at health system transformation;
- Engaging consumers and businesses on health care cost and quality initiatives; and
- Partnering with a wide range of stakeholders to promote informed dialogue, recommend evidence-based policies, and identify collaborative solutions.

(2) review significant drivers of cost growth and identify interventions, innovations, and policies that can moderate these drivers. The necessary data to examine the growth in total health care expenditures between 2012 and 2013 will not be available until mid-2014 and therefore we will not examine health care spending growth relative to the benchmark in this year's report.

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1 Center for Health Information and Analysis. Massachusetts Household and Employer Insurance Surveys: Results from 2011. Boston (MA): Center for Health Information and Analysis; 2013 Jan.

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5 Baicker K, Chandra A. The Labor Market Effects of Rising Health Insurance Premiums. Journal of Labor Economics. 2006;24(3):609-634.

6 Massachusetts Budget and Policy Center. Massachusetts Budget Browser [Internet]. Boston (MA): Massachusetts Budget and Policy Center; [cited 2013 Dec 18]. Available from: http://www.massbudget.org/browser/index.php.

7 Massachusetts Taxpayers Foundation. Municipal Financial Data, 43rd Edition. Boston (MA): Massachusetts Taxpayers Foundation; 2013 Dec.

1. Profile of the Massachusetts Health Care System

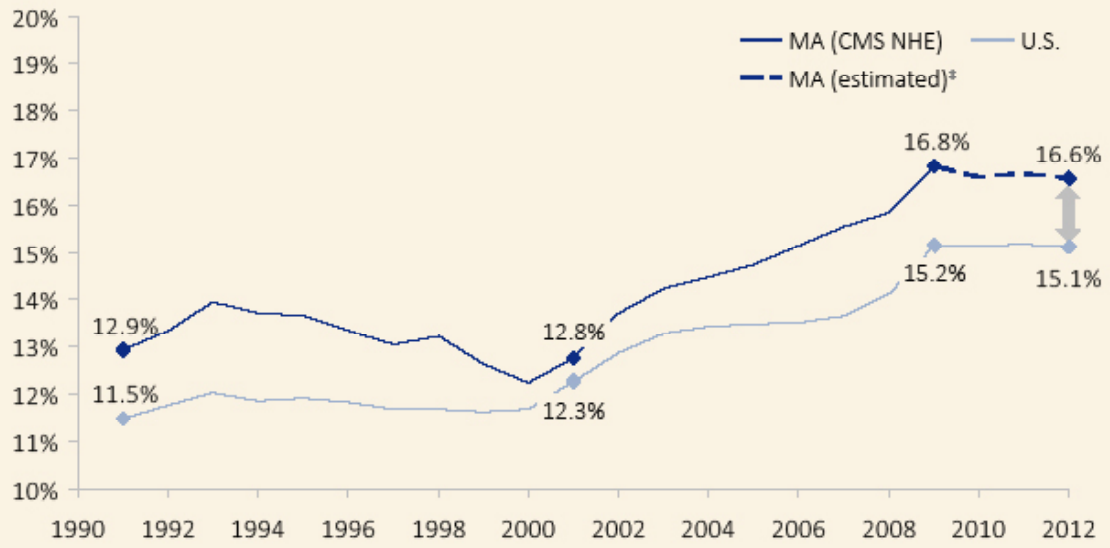
In this chapter, we present an overview of the Massachusetts health care system, examine spending levels and spending trend, and identify factors contributing to cost growth. With a focus on Chapter 224's cost containment goal, which relates the growth of health care spending to that of the state's economy, we examine how health care spending as a percent of the state economy has grown over time compared to the same measure for the United States (**Figure 1.1**).

Comparing Massachusetts with the United States and reviewing trends over time raises several important questions that we address in this chapter:

- What explains the difference in Massachusetts spending compared with the U.S. average?
- What contributed to the growth in Massachusetts health care spending over the past two decades?
- How do the characteristics of the state's health care system contribute to spending levels and trends?
- How does Massachusetts perform compared with the U.S. on measures of quality and access?

In this report, we often compare Massachusetts with the United States. In doing so, we do not suggest that the U.S. average is the appropriate benchmark for Massachu-

Figure 1.1: Personal health care expenditures* relative to size of economy
Percent of respective economy†



*Personal health care expenditures (PHC) are a subset of national health expenditures. PHC excludes administration and the net cost of private insurance, public health activity, and investment in research, structures and equipment.

†Measured as gross domestic product (GDP) for the U.S. and gross state product (GSP) for Massachusetts.

‡CMS state-level personal health care expenditure data have only been published through 2009. 2010-2012 MA figures were estimated based on 2009-2012 expenditure data provided by CMS for Medicare, ANF budget information statements and expenditure data from MassHealth, and CHIA TME reports for commercial payers.

Source: Centers for Medicare & Medicaid Services; Bureau of Economic Analysis; Center for Health Information and Analysis; MassHealth; Census Bureau; HPC analysis

setts' health care spending, nor that it is a standard for efficiency. Indeed, studies have demonstrated that U.S. per capita spending far exceeds the average spending of other nations and that a large proportion of U.S. spending on health care is unnecessary and wasteful.[1,2,3] Furthermore, there are unique benefits that Massachusetts derives from its level of health care spending that should be preserved. Rather, we make these comparisons to highlight potential areas of challenges and opportunities for reducing spending growth in Massachusetts. Although national or even state-to-state comparisons can be instructive, the goal of Chapter 224 is to keep health care spending in line with the long-term growth rate of the *state* economy.

This report relies on a number of nationally recognized data sources, including the National Health Expenditure Accounts from the Centers for Medicare & Medicaid Services (CMS), the Medical Expenditure Panel Survey (MEPS) from the Agency for Healthcare Research and Quality (AHRQ), the Behavioral Risk Factor Surveillance Survey (BRFSS) from the Centers for Disease Control and Prevention (CDC), the Annual Survey of the American Hospital Association (AHA), and the State Health Facts published by the Kaiser Family Foundation (KFF) (for more information, see **Technical Appendix B1: Data sources**). We also use data sets collected by Massachusetts state agencies, such as the Center for Health Information and Analysis (CHIA), the Office of the Attorney General (AGO), and the Department of Public Health (DPH). In addition, we use the Massachusetts All-Payer Claims Database (APCD), a detailed transaction history of all payments from major Massachusetts payers to providers (see sidebar **"What is the APCD and how do we use its data?"**). Although the scope of our APCD analyses is limited in this year's report, over time the data will enable us to examine health care spending at a granular level for particular populations of interest in future reports (for example, focused analyses of racial and socioeconomic disparities in health care).

What is the APCD and how do we use its data?

The Massachusetts All-Payer Claims Database (APCD) is an essential resource administered by CHIA with which researchers can examine health care spending and the evolution of health care and health insurance markets. The APCD contains medical, pharmacy, and dental claims from all payers that insure Massachusetts residents, as well as information about member, insurance product, and provider characteristics. It does not include payments that occur outside of the claims system, such as supplemental payments related to quality incentives or alternative payment methods, nor does it include self-pay spending that consumers incur outside of their insurance coverage.

For this report, we used a sample that consists of claims for the state's three largest commercial payers – Blue Cross Blue Shield of Massachusetts (BCBS), Harvard Pilgrim Health Care (HPHC), and Tufts Health Plan (THP) – and Medicare Fee-For-Service. Our analyses incorporated claims-based medical expenditures for Medicare and commercial payers, but not pharmacy spending, payments made outside the claims system, or MassHealth spending.[i] The Commission engaged the Lewin Group, a nationally recognized health policy research firm with Massachusetts APCD experience, to examine the APCD, assess its validity for use in cost trends analysis, validate the quality of its data, and propose methods to achieve our analytic objectives.

Analysis of the APCD has allowed us to understand medical spending as the product of two factors:

1. The **quantity** of services delivered, which may be divided into the number of units and the quantity of services per unit.
2. The **price** paid for those services, which may be divided into unit price (the price paid per unit of service by particular payers to particular providers), and provider mix (whether services are obtained in higher-priced or lower-priced settings), and payer mix.

In some analyses, we employ a third factor if useful:

3. The **medical need** or average **risk** level of the population. If this factor is included, then medical spending is the product of three factors: risk, quantity adjusted for risk, and price paid.

The APCD's rich detail enables us to deconstruct trends into its components of quantity, price paid, and risk level, and also allows for episode-level and person-level analyses such as the study of high-cost patients in Chapter 4. In future reports, refinements of our analysis may also isolate the impact of changes in benefit design, service mix, and provider mix on expenditure growth.

[i] The three commercial payers we focus on – BCBS, HPHC, and THP – represent nearly 80 percent of the commercial market. Medicare claims analyses do not include expenditures by Medicare Advantage plans. Examination of APCD data from MassHealth is ongoing, and MassHealth claims analyses will be included in future work by the Commission.

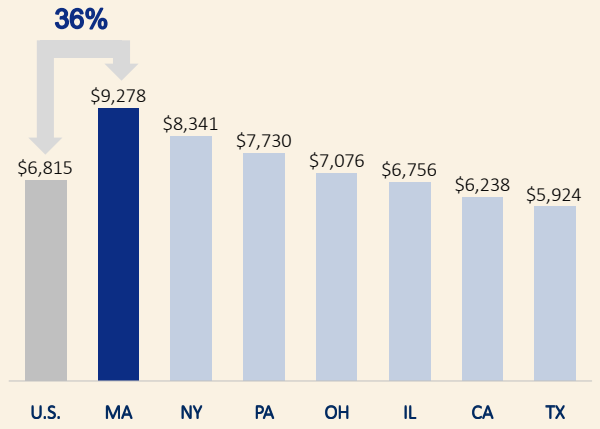
1.1 Spending Levels

In 2009, Massachusetts spent 36 percent more on health care per resident than the U.S. average, with higher spending across all payer types. This higher spending was concentrated in hospital care and long-term care and home health.

According to national data, spending per Massachusetts resident averaged $9,278 on personal health care expenditures in 2009,[ii] which was 36 percent (or $2,463) more than the U.S. average of $6,815 (**Figure 1.2**). This level of spending made Massachusetts the highest-spending U.S. state on a per capita basis (excluding the District of Columbia), although it is not the highest state when ranked by health care spending as a proportion of economic output.[iii] As a percentage of the economy, Massachusetts spent 16.8 percent on health care, compared with the U.S. average of 15.0 percent.

Massachusetts per capita spending remains higher than the U.S. average even after adjusting for certain differences in the state's profile. Research suggests that certain aspects of Massachusetts, including its older population, higher input costs,[iv] and broader insurance coverage, likely contribute to higher health care spending.[4,5] These factors account for 16 percentage points of the difference, leaving a 20 percentage point difference between Massachusetts and the U.S. average beyond these factors (see **Technical Appendix A1: Profile of Massachusetts** for more information).

Figure 1.2: Per capita personal health care expenditures* compared to U.S. and other states
Dollars, 2009



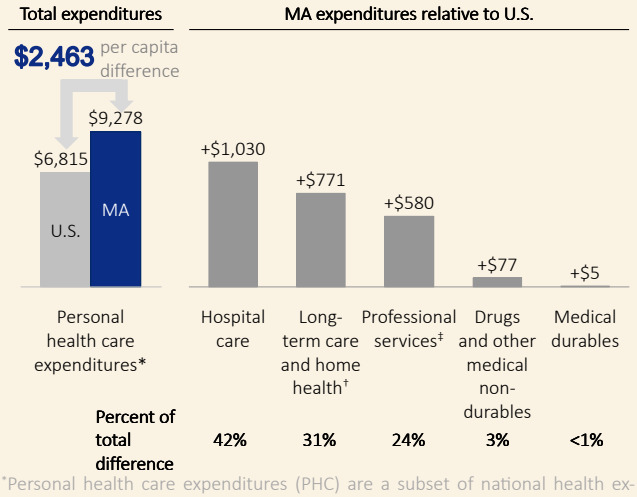
*Personal health care expenditures (PHC) are a subset of national health expenditures. PHC excludes administration and the net cost of private insurance, public health activity, and investment in research, structures and equipment.

SOURCE: Centers for Medicare & Medicaid Services; Bureau of Economic Analysis; HPC analysis

1.1.1 Spending levels by category of service

One way to analyze differences in spending levels is to break down spending into categories of service (**Figure 1.3**). In 2009, nearly three-quarters of the difference in spending between Massachusetts and the U.S. was in two categories: hospital care (which includes inpatient and outpatient care) and long-term care and home health (which includes both institutional nursing and rehabilitative services and skilled nursing services provided in the home).

Figure 1.3: Per capita personal health care expenditures* by category of service compared to U.S.
Dollars, 2009



*Personal health care expenditures (PHC) are a subset of national health expenditures. PHC excludes administration and the net cost of private insurance, public health activity, and investment in research, structures and equipment.

†Includes nursing home care, home health care, and other health, residential, and professional care.

‡Includes physician and clinical services, dental services, and other professional services.

SOURCE: Centers for Medicare & Medicaid Services; HPC analysis

[ii] 2009 is the most recent year for which personal health care expenditures (PHC) data is available.

[iii] Massachusetts spent significantly more than other states that are relatively wealthy or other states in the Northeast. Per capita spending in Massachusetts was 11 percent higher than in New York, 49 percent higher than in California, and nine percent higher than in Maine, the highest-spending neighboring state.

[iv] By input costs we mean costs associated with providing services. Our analysis used the Medicare Geographic Adjustment Factor (GAF), which adjusts for wages, office rents, supplies, and medical malpractice insurance premiums.

What do we mean by "health care expenditures"?

The term "health care expenditures" (or health care spending) refers to the total spending of a population on those activities related to maintaining and improving both physical and behavioral health.

In this report, we use several estimates of health care dollars spent on the care of individuals. These estimates exclude spending on public health programs, administrative costs for payers, and investments in research, buildings, and equipment. The three measures we use are personal health care expenditures, total medical expenses, and claims-based medical expenditures. Differences between these measures are explained below.

1. Personal health care expenditures (PHC) are measured by the CMS based on surveys of households, payers, and health care providers. PHC covers all spending by public and commercial payers as well as consumer out-of-pocket spending. This includes spending on services that are not covered by insurance benefits.
2. Total medical expenses (TME) are measured by the CHIA based on data reported by the 10 largest commercial payers in Massachusetts.[v] TME excludes services that are not covered by commercial insurance benefits (for example, nursing-home care that is paid in full by a consumer).
3. Claims-based medical expenditures are calculated by the Commission in our analysis of the APCD. Health care claims are submitted by providers to payers in order to receive payment for services, and this transaction history represents a rich data set for analysis (for more information, including data limitations, see sidebar "**What is the APCD and how do we use the data?**").

Although these three measures are useful indicators of health care spending, it is important to note that the benchmark for health care cost growth in Chapter 224 is linked to another measure, Total Health Care Expenditures (THCE), which are defined and calculated by CHIA, with the first formal determination anticipated in the autumn of 2014. Under the statute, THCE includes:

- All medical expenses paid to providers by public and commercial payers,
- All patient cost-sharing amounts (for example, deductibles and co-payments), and
- The net cost of private insurance (for example, administrative expenses and operating margins for commercial payers).

[v] The 10 largest commercial health care payers represent approximately 95 percent of the commercial health care market in Massachusetts.

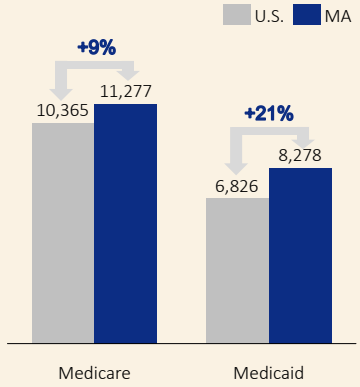
1.1.2 Spending levels by payer type

There are multiple insurers or "payers" – both public and commercial – in the U.S. health care market. In Massachusetts, approximately one-third of the population receives coverage from public payers (Medicare and MassHealth) and roughly two-thirds through commercial health insurance.[6] We examine how Massachusetts expenditures compared to U.S. levels within each of these segments.

For each type of payer, Massachusetts had a higher per member or per beneficiary spending level than the national average in 2009, with differences ranging from nine percent to 21 percent (**Figure 1.4**). In addition to having higher spending levels for each payer type, Massachusetts had a higher proportion of its population enrolled in Medicare and Medicaid.[6] Generally across the U.S., the Medicare and Medicaid populations have greater health care needs and spending levels than those in commercial insurance.[7]

As described in **Section 1.1.1,** for Massachusetts' total expenditures across public and commercial spending, hospital care along with long-term care and home health comprise three-fourths of spending above the U.S. average, with the remainder driven primarily by spending on professional services. These categories constitute an even larger proportion of spending above the U.S. average for Medicare and MassHealth (**Table 1.1**). For Medicare,

Figure 1.4: Per beneficiary personal health care expenditures* by payer type compared to U.S.
Dollars, 2009



* Personal health care expenditures (PHC) are a subset of national health expenditures. PHC excludes administration and the net cost of private insurance, public health activity, and investment in research, structures and equipment.

Source: Centers for Medicare & Medicaid Services; HPC analysis

Table 1.1: Contribution to difference from U.S. per capita average by category of service

Percent of difference in per capita spending, 2009

	All payers	Medicare	Medicaid
Total difference in per capita spending	$2,463	$1,452	$912
Hospital	42%	90%	31%
Long-term care and home health*	31%	53%	73%
Professional services†	24%	-35%	5%
Drugs and other medical non-durables	3%	-2%	-11%
Medical durables	0%	-5%	2%

* Includes nursing home care, home health care, and other health, residential, and professional care.

† Includes physician and clinical services, dental services, and other professional services.

SOURCE: Centers for Medicare & Medicaid Services; HPC analysis

spending in Massachusetts is below the national average in every category except hospital care and long-term care and home health. For MassHealth, nearly three-fourths of the spending above national average is in long-term care and home health, with most of the remaining difference in hospital care.

While CMS does not develop national estimates for commercial spending by category of service, all-payer figures suggest that spending differences in hospital care, long-term care and home health, and professional services may account for higher spending levels for Massachusetts residents with commercial insurance as well.

1.1.3 Spending levels by quantity and price

Spending is comprised of two components: how many services are used (quantity or utilization) and how much is paid (price). We examine how each of these components contributed to the difference in spending between Massachusetts and the United States in 2009.

Utilization

Massachusetts residents utilized significantly more hospital services and long-term care, consistent with the finding that these categories of service account for a significant component of the state's spending above national average.

Compared to the U.S. average in 2011, Massachusetts residents were admitted to a hospital 10 percent more often after adjusting for age[vi], visited emergency rooms 13 percent more often, and used hospital-based outpatient services[vii] (excluding the emergency department) 72 percent more often (**Table 1.2**).[8]

Within the long-term care and home health category, in 2011, the rate of residents in nursing facilities in Massachusetts was 46 percent greater than the U.S. average, with the state's age profile accounting for only 14 percentage points of this difference.[9,10]

Table 1.2: Hospital utilization and commercial prices compared to U.S. average

Per 1,000 persons, 2011 except where noted

	MA	U.S.	Difference (%)
Hospital inpatient			
Inpatient admissions (indexed to US, age-adjusted)	1.10	1.00	10%
Inpatient average length-of-stay	5.0	5.4	-7%
Inpatient days	631	600	5%
Inpatient surgeries*	32	32	0%
Hospital outpatient			
Emergency department (ED) visits	468	415	13%
Outpatient visits, excluding ED†	2,907	1,691	72%
Outpatient surgeries*	71	56	27%
Commercial prices‡			
All services	--	--	3%
Common inpatient services§	--	--	5%

* Values for inpatient and outpatient surgeries are from 2010.

† Outpatient hospital visits include all clinic visits, referred visits, observation services, outpatient surgeries, and emergency department visits.

‡ Values for commercial prices are from 2007-09.

§ Common inpatient services are defined as those DRGs which had at least 50 occurrences in every hospital referral region.

ii Common inpatient services are defined as those DRGs which had at least 50 occurrences in every hospital referral region.

SOURCE: Kaiser Family Foundation; American Hospital Association; Medical Expenditure Panel Survey; Analysis by Chapin White of a report from the 1995-2009 Truven Health Analytics MarketScan® Commercial Claims and Encounters Database (copyright © 2011 Truven Health Analytics, all rights reserved); Harvard University research conducted for Institute of Medicine; HPC analysis

Price

Examining price is more difficult because prices are determined differently for each payer type (see sidebar **"What do we mean by 'price'?"**). Price in the commercial

[vi] Inpatient admissions were indexed to the U.S. average and adjusted for age differences in order to allow for cross-state comparisons (for more information, see Technical Appendix A1: Profile of Massachusetts).

[vii] Outpatient hospital visits include all clinic visits, referred visits, observation services, and outpatient surgeries, but exclude emergency-room visits.

market is determined through payer-provider contract negotiations. National data sets on commercial price levels are limited, making state-by-state comparisons challenging.[viii] Available data are often limited to a subset of participating data contributors, such as large multi-state employers or individual national payers. These employers and payers may have an insurance product mix that does not necessarily reflect the mix of a particular state, so these data may not provide a complete view of price levels in local markets.

Two recent analyses based on data capturing roughly one-third of the national commercial market suggest that prices in Massachusetts are approximately three to five percent higher than the U.S. average.[11,12] In both of these studies, price differences observed included the impact of higher unit prices and of residents using higher-priced providers (also known as provider mix).

Recent reports by the AGO and CHIA have highlighted the importance of provider mix in understanding spending levels.[13,14,15] For example, there is two- to three-fold variation in the prices paid from lower-priced to higher-priced hospitals that cannot be explained by differences in the types of patients cared for or the quality of outcomes achieved.[16] Moreover, the effect of these differences is amplified by the fact that Massachusetts residents receive more of their care from these higher-cost settings; 51 percent of all commercial payments by the top 10 largest payers are made to top-quartile priced hospitals, compared with six percent to the lowest priced quartile.[13]

In Medicare, prices are set by the federal government, which establishes a standard fee schedule and makes adjustments for regional input costs, cost of graduate medical education, and the cost of treating a disproportionate share of low-income patients. A CMS analysis showed that in 2009 one percentage point of higher spending in the Medicare fee-for-service program in Massachusetts was due to utilization. This suggests that most of the nine percent difference between Massachusetts and the U.S. was due to price, both unit price and provider mix.[ix,17]

In Medicaid, prices are set by state Medicaid programs and managed care organizations, resulting in significant state-to-state variation. In 2009, spending per beneficiary was 21 percent greater in Massachusetts compared with the U.S. average. Factoring in both higher per beneficiary spending and greater enrollment, Medicaid expenditures per resident are 49 percent higher than the national average. This is likely driven by both price and utilization factors. One review of prices paid by Medicaid for physician services in 2008 showed that MassHealth paid 30 percent more than the average state Medicaid program.[x,18] Moreover, Massachusetts has had a long-standing commitment to provide broad access to coverage that includes a range of needed services. MassHealth has more inclusive eligibility criteria and higher benefit levels for enrollees compared to many states. Income thresholds for Medicaid eligibility in Massachusetts are higher than the national average, and a larger proportion of Medicaid spending in the state is devoted to benefits that extend beyond those mandated by federal law.[19] Thus, while higher Medicaid prices contribute to higher spending per beneficiary in Massachusetts, the difference in spending between Massachusetts and the U.S. is also influenced by several other policy choices.

What do we mean by "price"?

Defining "price" in health care can be complex because the total amount, or price, that is paid to a provider for health care services often derives from multiple sources, including the consumer's out-of-pocket payment to the provider and payments from the consumer's insurer. In this report, we define "price" as the total amount paid to a provider for a unit of service, including both the amount paid by the payer and the amount paid by the consumer through a co-payment or deductible.

It is worth noting that this definition of price differs from the "charges" that may appear on hospital bills. Typically, hospitals have a "charge master" that contains listed fees for each procedure. In practice, commercial and public payers do not pay the charges listed in the charge master, but rather pay a negotiated price (in the case of commercial payers) or a pre-set fee schedule (in the case of Medicare and MassHealth). Our work focuses on amounts paid rather than amounts listed in the charge master.

[viii] Although Massachusetts has taken a number of steps to increase the transparency and public availability of price information, other states have not taken similar steps.

[ix] The measure of Medicare utilization uses a composite of all paid services, including hospital and non-hospital institutional claims, professional services, pharmacy, and other categories.

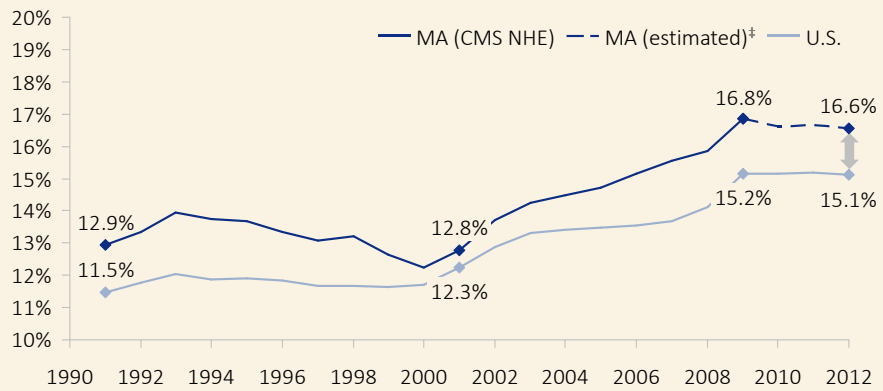
[x] In 2012, MassHealth paid 21 percent more for physician services.

1.2 Spending Trends

From 2001 to 2009, health care spending in Massachusetts grew faster than both the national average and the state's economy. Since 2009, health care spending growth has slowed in both Massachusetts and the United States.

Figure 1.5: Personal health care expenditures* relative to size of economy

Percent of respective economy†



*Personal health care expenditures (PHC) are a subset of national health expenditures. PHC excludes administration and the net cost of private insurance, public health activity, and investment in research, structures and equipment.

†Measured as gross domestic product (GDP) for the U.S. and gross state product (GSP) for Massachusetts

‡CMS state-level personal health care expenditure data have only been published through 2009. 2010-2012 MA figures were estimated based on 2009-2012 expenditure data provided by CMS for Medicare, ANF budget information statements and expenditure data from MassHealth, and CHIA TME reports for commercial payers.

Source: Centers for Medicare & Medicaid Services; Bureau of Economic Analysis; Center for Health Information and Analysis; MassHealth; Census Bureau; HPC analysis

In 1991, health care spending in Massachusetts represented 12.9 percent of the state economy, compared with 11.5 percent for the United States (**Figure 1.5**). Throughout the 1990s, personal health care expenditures in Massachusetts grew in step with the U.S. rate (**Table 1.3**) but faster economic growth in Massachusetts helped narrow the gap in the percentage of economic resources dedicated to health care.

This trend changed during the 2000s. In that decade, Massachusetts' economic growth matched that of the United States, but annual health care spending growth in Massachusetts was 1.0 percentage point higher than the U.S. average. This shift resulted in the state spending more on health care relative to the size of its economy than the U.S., eventually reaching

Table 1.3: Annual growth of health care expenditures and the economy

Per capita compound annual growth rate

	1991-2001	2001-2009	2009-2012
*Growth of health care expenditures**			
MA	5.4%	6.5%	3.1%
U.S.	5.2%	5.5%	3.1%
Growth of economy†			
MA	5.5%	2.9%	3.7%
U.S.	4.5%	2.8%	3.2%
Excess growth ‡			
MA	-0.1%	3.5%	-0.5%
U.S.	0.7%	2.7%	-0.1%

* CMS personal health care estimates are used through 2012 for US and 2009 for MA. CMS state estimates end in 2009; HPC estimates are used for 2009-2012 MA growth.

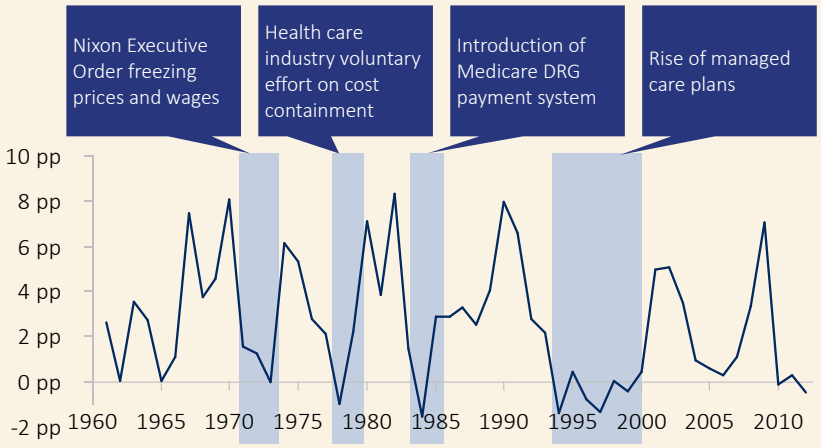
† Growth of economy defined as GDP growth for U.S. and GSP growth for MA.

‡ Excess growth defined as health care growth less economic growth. A positive value means health care grew faster than the economy.

Source: Centers for Medicare & Medicaid Services; Bureau of Economic Analysis; Center for Health Information and Analysis; MassHealth; Census Bureau; HPC analysis

Figure 1.6: U.S. growth in personal health care expenditures* in excess of economic growth

Percentage points of health care expenditure growth minus GDP growth



*Personal health care expenditures (PHC) are a subset of national health expenditures. PHC excludes administration and the net cost of private insurance, public health activity, and investment in research, structures and equipment.

SOURCE: Centers for Medicare & Medicaid Services; Bureau of Economic Analysis; HPC analysis

a high of 16.8 percent in 2009. This return to faster growth after a period of slower growth has repeatedly occurred over the past five decades at the U.S. level (**Figure 1.6**).

Since 2009 the United States has seen a slowdown in health care spending growth.[20] Massachusetts has followed a similar trend. Health care spending has grown more slowly than the state economy in two of the past three years; this occurred only six times in the 18 years before, and not at all since 2000. This recent slower health care growth coupled with faster economic growth has marginally decreased the percent of the economy that Massachusetts spends on health care from 16.8 to 16.6 percent.

1.2.1 Trend by category of service

Higher health care spending growth in the 2000s was not confined to a particular category of service (**Table 1.4**). Massachusetts spending growth was equal to or higher than that of the U.S. in all expenditure categories. In addition, expenditures in hospital care as well as in long-term care and home health – the categories that differ most from U.S. averages – also grew faster than the U.S. rate, which has the effect of expanding differences over time.

1.2.2 Trend by payer type

From 2001 to 2009, growth in Massachusetts' total per capita spending was higher than the U.S. average, but that did not hold true among public payers (**Table 1.4**). Growth in both Medicaid and Medicare has been slower in Massachusetts compared to the United States. This trend suggests that the higher growth in spending during this period was concentrated in the commercial market, although we cannot determine the magnitude of the difference because of shifts in enrollment between payers.

Reviewing spending growth rates by category of service in public payers, expenditures in hospital care grew more slowly for Massachusetts Medicare and Medicaid beneficiaries than the U.S. average. While percentage growth rates for long-term care and home health were lower than the U.S. average for both payer types, per capita dollars of growth were greater, since the growth was on a larger base spending level (**Table 1.4**).

Since 2009, we estimate that growth in health care spending in Massachusetts has been closer to U.S. rates

Table 1.4: Annual growth of health care expenditures by category of service

Per capita compound annual growth rate, 2001-2009

	Overall		Medicare		Medicaid	
	MA	U.S.	MA	U.S.	MA	U.S.
Total	6.5%	5.5%	6.4%	6.8%	0.7%	2.3%
Hospital	7.1%	5.8%	4.2%	4.2%	0.8%	3.1%
Long-term care and home health*	6.1%	5.7%	7.9%	10.4%	2.3%	2.7%
Professional services†	6.5%	5.1%	5.2%	5.5%	1.1%	4.5%
Drugs and other medical non-durables	6.0%	6.0%	46.4%	36.9%	-12.8%	-5.8%
Medical durables	4.3%	3.3%	2.1%	4.6%	6.8%	3.0%

*Includes nursing home care, home health care, and other health, residential, and professional care.

†Includes physician and clinical services, dental services, and other professional services.

SOURCE: Centers for Medicare & Medicaid Services; HPC analysis

Table 1.5: HPC estimates of recent growth of health care expenditures by payer type

Compound annual growth rate, 2009- 2012

	Enrollment	Per capita spending
Total	0.3%	3.1%
Medicare	2.7%	1.5%
Medicaid	4.7%	0.8%
Commercial	-1.0%	2.8%

SOURCE: Centers for Medicare & Medicaid Services; Bureau of Economic Analysis; Center for Health Information and Analysis; MassHealth; Census Bureau; HPC analysis

(**Table 1.5**). This slowdown in spending growth occurred across all payer types. The statewide per capita growth rate averaged 3.1 percent over the three-year period, a rate higher than any individual payer. This can occur because the statewide growth rate reflects the growth rates observed within each payer, as well as the effects of shifts in enrollment between payers, which the data suggest (see **Technical Appendix A1: Profile of Massachusetts** for more information).

Table 1.6: Trends in hospital utilization and commercial prices from 2001-2009

Per 1,000 persons compared to U.S. average

	2001	2009	Change
Overall per capita spending	26%	36%	+10 p.p.
Hospital inpatient			
Inpatient admissions	1%	7%	+6 p.p.
Hospital outpatient			
Emergency department (ED) visits	14%	14%	0 p.p.
Outpatient visits, excluding ED*	66%	65%	-1 p.p.
Commercial prices†			
Common inpatient services‡	-5%	5%	+10 p.p.

* Outpatient hospital visits include all clinic visits, referred visits, observation services, outpatient surgeries, and emergency department visits.

† Values for commercial prices are from 2007-09.

‡ Common inpatient services are defined as those DRGs which had at least 50 occurrences in every hospital referral region.

SOURCE: Kaiser Family Foundation; American Hospital Association; Analysis by Chapin White of a report from the 1995-2009 Truven Health Analytics MarketScan® Commercial Claims and Encounters Database (copyright © 2011 Truven Health Analytics, all rights reserved); HPC analysis

CHAPTER 58 AND ITS IMPACT ON HEALTH CARE SPENDING

In 2006, the Massachusetts state legislature enacted Chapter 58. This landmark law was designed to provide universal health insurance coverage for state residents through an expansion of Medicaid eligibility, enhanced government subsidies, and a health insurance exchange to help individuals and small businesses purchase commercial insurance.

Today, approximately 439,000 additional Massachusetts residents have health insurance coverage and Massachusetts' insurance coverage rate of 96.9 percent is the highest in the country.[21] For the state, these reforms increased government health care spending by approximately one percent of the total state budget.[22]

In terms of overall health care expenditures, the data show a slight increase in 2007 around the time of implementation of Chapter 58. This small increase in overall health care spending would be expected, resulting from the increase in the state spending on coverage and subsidies and from the higher average spending rate of insured people compared to uninsured people.

Spending levels in Massachusetts were significantly higher than the U.S. average before 2006, and the state's health care cost growth rate was faster than the nation's. These trends pre-date the implementation of Chapter 58. Expansion to near-universal coverage had other effects which impact health care expenditures. For example, recent research suggests a likely positive impact on health status and the use of preventive services in Massachusetts compared to other New England states, especially in low-income populations.[23]

1.2.3 Trend by quantity and price

From 2001 to 2009, the difference in per capita personal health care expenditures between Massachusetts and the national average increased from 26 percent to 36 percent, an increase of 10 percentage points (**Table 1.6**).

In terms of utilization, data suggest that the use of hospital services has remained steady relative to U.S. averages. Inpatient admissions per capita in Massachusetts increased six percentage points faster than the national trend. Emergency department visits per capita stayed flat relative to the U.S. average, while per capita outpatient visits excluding the emergency department grew one percentage point more slowly than the U.S. average.

Commercial price data suggest a much faster growth trend compared to the U.S. average. One data set shows that from 2001 to 2009 Massachusetts health care inpatient prices compared to the U.S. average grew 10 percentage points.[11] This increase represents both higher unit prices and changes in the site of services to higher-priced settings.

Data on utilization and price indicate that the increase in Massachusetts spending relative to the United States from 2001 to 2009 was driven by commercial prices. Our analysis of APCD data also shows that price was the main driver of growth in the commercial market from 2009 to 2011. This price growth relative to the nation is especially significant because it comes on top of already high growth across the United States – hospital prices nationally grew by 48 percent over the eight years from 2001 to 2009.[24]

1.3 Delivery System Overview

The Massachusetts provider market is growing increasingly concentrated, and provider organizations are exploring innovative care delivery models. Payers are shifting to product structures promoting value-based consumer choices and to alternative payment methods such as global budgets.

1.3.1 Provider market overview

In this section, we describe the Massachusetts provider market, with a particular focus on hospitals and physicians, recognizing the large difference in hospital care spending between Massachusetts and the U.S. and the state's higher utilization of hospital outpatient services. The Massachusetts health care delivery system is characterized by a greater proportion of hospital beds in major teaching facilities and a greater concentration of not-for-profit hospitals as compared to the nation overall (**Table 1.7**). Analyses of provider price variation in Massachusetts have shown that the average prices paid for equivalent services at teaching hospitals is higher than at community hospitals.[25]

Massachusetts also has a large health care workforce relative to its population. Although the state has fewer hospital beds per 1,000 persons than the national average, its labor workforce exceeds national averages (**Table 1.8**). From 2001 to 2009, the number of health care practitioners[xi] in the state grew at an annual rate of 2.6 percent, and their mean salary grew by 5.0 percent annually. Nationwide, the number of practitioners grew by 2.1 percent and mean salaries by 4.3 percent over the same time period.[26]

Table 1.7: Hospital composition compared to U.S.

Percent of acute hospitals, 2011

	MA	U.S.
Major teaching hospitals	23%	5%
Critical access hospitals	4%	27%
By profit status		
For-profit hospitals	17%	21%
Not-for-profit hospitals	81%	58%
Public hospitals	3%	21%

Source: Medicare Payment Advisory Commission; Kaiser Family Foundation; HPC Massachusetts acute hospital list

Table 1.8: Health care system capacity compared to U.S.

Per 1,000 persons, 2011

	MA	U.S.	Difference
Number of acute hospitals	0.012	0.016	-26%
Hospital beds	2.4	2.6	-8%
Health care practitioners and technical occupations	34.6	24.1	+43%

Source: Kaiser Family Foundation; American Hospital Association; Bureau of Labor Statistics Occupational Employment Statistics Survey; American Community Survey; HPC analysis

Two trends among providers have been observed in recent years. One trend is growing corporate consolidation of provider organizations, including acquisitions of community hospitals and hospital employment of independent physicians. This consolidation has increased the market share of a number of large systems, including those anchored by major teaching hospitals. At the same time, provider organizations are pursuing a variety of innovative care delivery models, such as patient-centered medical homes (PCMHs) and accountable care organizations (ACOs), with an aim towards more coordinated, higher-quality care delivery. These two trends can be related, as some provider organizations contend that scale and corporate integration are required to achieve more efficient, effective, and coordinated care delivery, while others have demonstrated success providing integrated, accountable care on a smaller scale.[27,28]

Trend number 1: Provider mix and consolidation

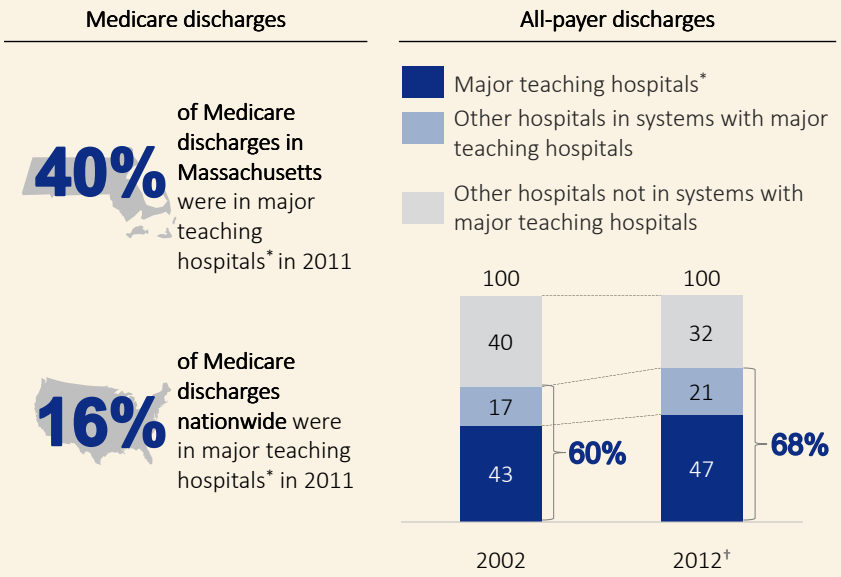
Provider consolidation is a well-documented trend in the United States and in Massachusetts. Eighty percent of current acute hospitals in Massachusetts were involved in a merger, acquisition, or other form of contractual or corporate affiliation between 1990 and today.[29] Alignments, including acquisitions and affiliations, have continued at a

varying pace concurrently with other trends in the health care market, such as the growth of health maintenance organizations (HMOs) and capitation in the 1990s, deregulation of the hospital industry after legislation in 1991, and the increased adoption of accountable care delivery models and payment methods in recent years.

Growing concentration in provider markets raises concerns, as evidence has demonstrated that such consolidation often decreases competition and increases the prices of health care services.[30,31,32,33,34] Within Massachusetts, provider organization size and market leverage are correlated with higher prices, both for fee-for-service payments and for risk contract payments. These higher prices are not explained by better quality performance.[14,16] Moreover, higher-priced provider systems have grown their market share at the expense of lower-priced systems. In the 10 years between 2002 and 2012, the proportion of the state's total inpatient discharges from major teaching hospitals and the other hospitals controlled by systems with a major teaching hospital grew from 60 percent to 68 percent (**Figure 1.7**). This trend reflects the closure or repurposing of some community hospitals, the acquisition of other community hospitals by large systems, and broader usage of teaching hospitals in Massachusetts as a setting for delivering routine care. By 2011, Massachusetts Medicare patients used major teaching hospitals for 40 percent of their hospitalizations, compared with a 16 percent rate nationally.[35] Consolidation thus raises concerns about the role of provider mix in driving cost growth.

As discussed above, previous Massachusetts analyses have shown that prices paid to major teaching hospitals are on average higher than those paid to community hospitals.[25]

Figure 1.7: Discharges in Massachusetts hospital systems, 2002-2012
Percent of discharges



*Major teaching hospitals are defined as those with at least 25 residents per 100 beds.
†Based on systems in 2012. Does not include impact of transactions of Cooley Dickinson Hospital with Partners HealthCare System and Jordan Hospital with Beth Israel Deaconess Medical Center completed in 2013.
SOURCE: Center for Health Information and Analysis; Medicare Payment Advisory Commission; HPC analysis

How does the Health Policy Commission monitor changes in the provider market?

Chapter 224 directs the Commission to enhance the transparency of provider market structure and significant changes to market composition in several ways. The Commission is tasked with developing a comprehensive database of provider organization structure, composition, and size through the registration of provider organizations (RPO). RPO will provide an informational foundation to support market oversight functions, like assessing health care capacity and needs, evaluating the performance of different organizational models in in the state, and providing a map of relationships between participants in the market.

Furthermore, through notices that provider organizations file with the Commission in advance of any material change to their operations or governance, the Commission tracks the frequency, type, and nature of changes in the health care market. The Commission may also engage in a more comprehensive review of particular transactions anticipated to have a significant impact on health care costs or market functioning. The result of such "cost and market impact reviews" is a public report detailing the Commission's findings. In order to allow for public assessment of the findings, transactions may not be finalized until the Commission issues its final report. Where appropriate, such reports may identify areas for further review or monitoring, or be referred to other state agencies in support of their work on behalf of health care purchasers and consumers.

As provider organizations contend that additional scale and corporate integration are necessary to achieve more efficient, effective, and coordinated care, the potential cost and quality benefits of a transaction should be balanced against the concerns of increased market leverage and the weakening of lower-priced alternatives. For example, the growing market share of higher-priced systems can reduce the viability of lower-priced options for consumers. This can reduce the effectiveness of value-based innovations such as tiered and limited network products, which depend on the availability of lower-priced alternatives for their operation.[36]

Massachusetts providers have pursued delivery system innovation through a variety of organizational models. These approaches include relatively small, physician-based models that offer high-quality, coordinated care without ownership by a hospital or hospital system.[37] Where hospitals align with one another and with physicians, there are also alternative approaches to corporate ownership, including contractual alignments around shared population health management goals.[38,39] This spectrum of care delivery models in the state bears further examination as health care stakeholders consider the degree of corporate integration necessary and desirable to improve access to high-quality, cost-effective care.

Trend number 2: Delivery system innovation

Innovation in accountable care models is another trend in the Massachusetts delivery system in recent years. Under these models, networks of physicians and other health care providers are held accountable for cost and quality across a continuum of care for their patients. The 2008 Massachusetts Special Commission on the Health Care Payment System recommended a shift away from the fee-for-service payment system, which rewards volume rather than outcomes or efficiency, toward the increased adoption of global budget-based alternative payment methods (APMs), which have since gained momentum in Massachusetts.[40] Providers are moving to adopt care delivery models that deliver coordinated, patient-centered care, integrating physical and behavioral health care and shifting toward a focus on population health management.[41] These models are designed not only to reduce expenditures, but also to improve quality of care.

Today, all of the major payer types in Massachusetts are actively pursuing alternatives to traditional fee-for-service payments with incentives to improve coordination and quality performance in the delivery system (for more information, see **Section 1.3.2)**. Further, many provider organizations in Massachusetts have agreed to enter into these types of arrangements with payers. Of the 32 organizations nationally that participated in the Medicare Pioneer ACO model, five were based in Massachusetts: Atrius Health, Beth Israel Deaconess Care Organization, Mount Auburn Cambridge Independent Practice Association, Partners HealthCare System, and Steward Health Care System. In this financial arrangement, the savings were shared between Medicare and the ACO. First-year results show that four out of the five Massachusetts Pioneer ACOs were able to keep growth of their Medicare costs under the budgeted amount.[28] Moreover, 13 Massachusetts provider organizations have participated as Medicare Shared Savings Program ACOs.[42] Evidence from other ACO demonstrations suggest that providers who have entered risk-based contracts covering a portion of their patient panels are investing in care delivery reforms for their full patient populations in response to the new payment methods.[43]

Still, challenges remain with these models. Risk-based contracts to support accountable care have been limited in the commercial insurance market by the shift toward preferred provider organization (PPO) insurance products, whose members are not currently covered by APMs.[27] Providers have also noted that constraints on the availability of data about their patient populations, especially for care delivered in other systems, have limited their ability to effectively manage and integrate care.[27] Furthermore, certain important services such as behavioral health care continue to face challenges.[27] There are a number of persistent barriers to behavioral health integration, including numerous reimbursement issues and limited provider capacity to treat behavioral health patients.[44] While these types of challenges have led to mixed results nationwide, the early success of four of the five Massachusetts Pioneer ACOs shows potential for Massachusetts provider organizations.[45,46,47]

At the practice level, many organizations are engaging in accountable care innovation through the development of PCMH models.[xii] More recently, 30 primary care practices have elected to participate in MassHealth's Primary Care Payment Reform (PCPR), a PCMH-based program. The PCPR program is supported by funding through a State Innovation Model (SIM) Testing grant awarded to Massachusetts by CMS to support these types of transformations.

[xii] Currently, 149 practices are accredited. This figure includes accreditation by the National Committee for Quality Assurance (NCQA), the Joint Commission (JC), and/or the Accreditation Association for Ambulatory Health Care (AAAHC).

Under Chapter 224, the Commission is responsible for developing certification programs for PCMHs and ACOs. The Commission is also responsible for administering the Community Hospital Acceleration, Revitalization, and Transformation (CHART) investment initiative, which is a competitive program with nearly $120 million to be distributed to select community hospitals to promote efficient, effective, and coordinated care delivery while reducing costs. CHART investments will also work to support these hospitals in developing the capabilities needed to become ACOs, to advance the adoption of health information technology, and to increase organizations' readiness to adopt APMs that involve bearing risk for their performance.

1.3.2 Payer market overview

Nearly all of Massachusetts residents have health insurance. Residents in Massachusetts receive their health insurance from public payers – Medicare and MassHealth primarily – and from various commercial sources, including those provided by employers or purchased by individuals (**Table 1.9**). Approximately 63 percent of residents receive commercial health insurance, either through their employer or purchased through the individual market.[6] Self-insured employers make up nearly half of the commercial market.[13]

Table 1.9: Health insurance coverage by insurance type compared to U.S.

Percent of population, 2011

	MA	U.S.
Employer	58%	49%
Individual	5%	5%
Medicaid	16%	13%
Medicare	13%	13%
Dual-eligible	4%	3%
Other Public	<1%	1%
Uninsured	3%	16%

SOURCE: Kaiser Family Foundation; Center for Health Information and Analysis; HPC analysis

The Massachusetts commercial market is highly concentrated, with approximately 45 percent of members represented by one payer, BCBS. BCBS and the second- and third-largest commercial payers, HPHC and THP, represent 79 percent of the market.[13] Massachusetts plans achieve high performance by national accreditation bodies of clinical performance and member satisfaction, with the three largest payers in the state among the 10 highest ranked plans by the National Committee for Quality Assurance (NCQA).[48]

In recent years, the Massachusetts commercial health insurance market has experienced significant reform efforts to improve both demand-side and supply-side incentives. Within the demand-side reforms, purchasers and individual consumers are called upon to play a more active role in ensuring they receive high-value care through a shift in financial incentives. Within the supply-side reforms, payers contract with provider groups to manage the care of their members through APMs that aim to reward providers based on the outcomes and cost efficiency they achieve.

Demand-side trends: product design

Over the past few years, consumers have seen the growth of insurance products that encourage them to make value-based choices about their care. These include products that increase the level of cost-sharing that consumers are expected to pay out of pocket, such as high-deductible health plans (HDHP), as well as tiered or limited network products that offer reduced co-payments if a higher-quality/lower-cost provider group is chosen. Employers may offer these HDHPs and tiered or limited network plans because of the potential for lower premiums, which derive from greater use of more efficient providers.[xiii] For demand-side incentives like these to work, markets must provide consumers with information on prices and quality to empower them as informed purchasers of health care. While the availability of such information has been limited in the past, Chapter 224 institutes new requirements for payers and providers to make the prices of health care services more transparent (see sidebar **"What is Massachusetts doing on price transparency?"**).

HDHPs as well as tiered or limited network plans have grown significantly in recent years, though at varying rates. For example, BCBS reports that the share of its commercial members enrolled in HDHPs increased from 19 percent to 25 percent between 2009 and 2012.[27] Each of the three largest payers has seen an incremental 5 to 11 percent of its membership shift to tiered or limited network products over the last three years.[27] Part of this is due to Chapter 288 of the Acts of 2010 which required health

[xiii] For more information, see the Commission's report on consumer-driven health plans available at http://www.mass.gov/anf/docs/hpc/health-policy-commission-section-263-report-vfinal.pdf.

What is Massachusetts doing on price transparency?

Recent articles in the national press have called attention to the lack of transparency around prices in health care.[49] Massachusetts has been at the forefront of efforts to enhance price transparency, first in Chapter 58 of the Acts of 2006 with the establishment of a website with comparative cost and quality information (MyHealthCareOptions), and continuing in Chapter 288 of the Acts of 2010 with required annual reporting of relative prices. Chapter 224 improves on this by instituting price transparency requirements for both payers and providers. As of October 2013, insurance companies are required to provide estimates of expected costs for a given service at a particular provider to consumers requesting the information online or over the phone. These estimates must be tailored to a consumer's own insurance product, so that a consumer can understand the expected out-of-pocket cost given his or her deductible and other cost-sharing policies. Chapter 224 also requires insurance companies to offer this price information to providers who are looking to refer their patients. Beginning in 2014, providers will also be required to provide price information to consumers who request it.

or limited network health insurance products plans to offer tiered with premiums at least 12 percent lower than comparable products without a selective network of providers. Chapter 224 furthers the development of these products, increasing the required pricing differential to 14 percent. These products are generally designed to create financial incentives for consumers to make value-based health care decisions such as choosing high-quality, lower-priced providers and avoiding unnecessary services. It is important to monitor the impact of such products to ensure that specific product designs do not inhibit or otherwise discourage consumers from seeking necessary care.

Alongside the growth in plans that promote consumer engagement, there has also been a shift away from insurance product structures that require members to designate a primary care provider (PCP). Historically, Massachusetts residents have chosen HMO insurance products, which require PCP designation, at a higher rate than the national average.[xiv,50] In recent years, however, the commercial insurance market has experienced a shift away from HMOs and toward PPO products. From 2009 to 2012, the share of members in PPO products grew for the three largest commercial payers from 29 percent to 37 percent of their total membership.[27] Open questions remain as to whether this trend is driven by payer, employer, or individual preferences around premium price or breadth of choice of providers.

Supply-side trends: alternative payment methods

Commercial and public payers have also been working to support delivery system reform through APMs. In the past few years, Medicare and many of the commercial payers in Massachusetts have increasingly adopted APMs that establish a global budget for provider organizations. In these models, payers establish an expected level of spending (called the global budget) for members managed by the provider organization, typically based on spending in previous years with various adjustments. If the provider organization keeps costs below the global budget, it receives a share of the savings. If costs exceed the global budget, the provider organization may be responsible for covering a portion of the excess costs. Examples of these models include Medicare's Pioneer ACO program and BCBS's Alternative Quality Contract. Other major commercial payers, including THP, HPHC, and Fallon Community Health Plan (FCHP), also have global budget payment methods, and, as described above, MassHealth recently launched its PCPR program. These types of global budget payment methods are not unprecedented – several provider organizations in Massachusetts have had risk-based contracts with payers since the 1990s, when capitation was prevalent – but they have experienced a resurgence in recent years through efforts to shift away from traditional fee-for-service payment methods.

Although many payers have implemented some form of APMs, a number of challenges persist. Considerable variation exists among payers in terms of the proportion of their enrollees covered, as well as the financial incentives for providers. In 2012, 35 percent of members across the top 10 commercial payers had PCPs who were paid for managing their care under a global budget payment method.[51] For public payers, only a minority of Medicare beneficiaries are included in the Medicare ACO programs, and MassHealth only recently launched its PCPR program in late 2013. Even for patients whose care is managed under these payment methods, most providers are paid initially in the traditional fee-for-service method and supple-

[xiv] In our analysis, we primarily distinguish between insurance products based on whether they require identification of a primary care provider. HMO and point-of-service (POS) product types require designation of a PCP, while preferred provider organization and indemnity product types do not. In this section, our discussion of HMO products also applies to POS products, and our discussion of PPO products also applies to indemnity products.

mental payments or adjustments are made at the end of a performance period to create quality and cost incentives. Moreover, providers have testified that the design of these models varies significantly by payer, including the nature of incentives and the level of payment.[27] For a particular payer's model, the negotiated supplemental payments and incentives differ significantly between provider organizations. Payment levels are based on historic levels of payment, which can perpetuate disparities in payment levels between provider organizations.[14] Finally, some services, such as behavioral health, are often reimbursed through separate funding models leading to misaligned incentives.

Another potential obstacle to the continued adoption of APMs is the significant shift in the market from HMO products to PPO products discussed previously (see **Demand-side trends: product design**). To date, commercial payers have only structured global budget payment contracts for members under HMO products because these methods rely on members identifying a PCP who is deemed accountable for their care. Thus, global budget payment contracts cover the majority of the HMO market, but none of the PPO market.[51] The commercial payers have not established an APM that may be applied to growing PPO products, in which members are not required to identify a PCP. Medicare has implemented its Pioneer ACO program without requiring beneficiaries to identify a PCP. Instead an algorithm is used to "attribute" beneficiaries to the provider organization that was responsible for the preponderance of their primary care in a particular time period. In the commercial market, payers are investigating similar attribution models but they have not yet been implemented.

In testimony at the Commission's 2013 cost trends hearing, several provider organizations noted the challenges in investing in care delivery transformation while significant proportions of their patient panels switch to PPO products that do not have risk-based payment methods. These provider organizations highlighted the importance of APMs in supporting care delivery transformation and encouraged their faster adoption in PPO insurance products.[27]

1.4 Quality Performance and Access

The Massachusetts health care system achieves high quality performance and provides broad access to care, although there are opportunities for continued quality and access improvement.

In examining quality and access performance of the Massachusetts health care system, we look at the level of health needs of the Massachusetts population, measures of quality performance of the health care system, and the accessibility of care for Massachusetts residents.

1.4.1 Health status

Massachusetts residents have better overall health than the United States average, with an additional 1.6 years of life expectancy and 0.9 fewer physically or mentally unhealthy days per month.[52,53] Research shows that such outcomes are driven largely by social and behavioral factors, along with public health policies, while personal health care services delivered account for only 10 percent of general variation in health status.[54] Massachusetts residents engage in fewer risky behaviors (such as smoking) and have lower disease prevalence than national averages for four of five common chronic conditions (**Table 1.10**).

The APCD allows for geographic analysis of these types of conditions. For example, in 2011 the prevalence of diabetes among the commercial and Medicare populations varied greatly by region (**Figures 1.8, 1.9**). This type of analysis is useful for monitoring care for chronic and behavioral health conditions, an area of significant interest for the Commission, explored further in **Chapter 4.**

Table 1.10: Selected population risk factors and disease prevalence compared to U.S.

Percent of population, 2011

	MA	U.S.	MA rank	Best state
Population risk factors				
Adults who are current smokers	18.2%	21.2%	9	11.8% (UT)
Overweight or obese (BMI > 25.0)	59.3%	63.5%	5	55.7% (HI)
Participated in physical activity in the past month	76.5%	73.8%	15	83.5% (CO)
Disease prevalence				
Diabetes	8.0%	9.5%	6	6.7% (CO)
Angina / coronary heart disease	3.8%	4.1%	15	2.5% (CO)
Cancer	12.0%	12.4%	21	9.2% (HI)
Depression	16.7%	17.5%	22	10.6% (HI)
Asthma	15.4%	13.6%	15	10.4% (TN)

Source: Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance Survey

Figure 1.8: Prevalence of diabetes by region among Medicare beneficiaries

Medicare prevalence rate

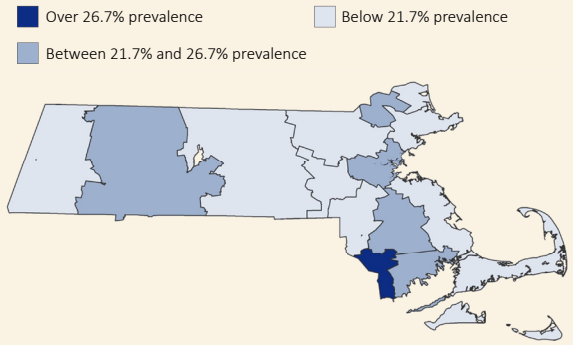
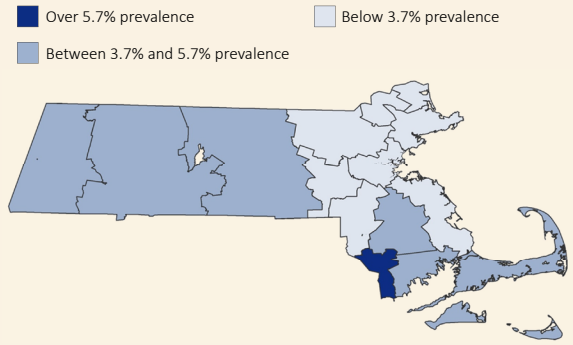


Figure 1.9: Prevalence of diabetes by region among commercial members

Commercial prevalence rate



SOURCE: All-Payer Claims Database; HPC analysis

1.4.2 Quality performance

Evaluation of quality measures is an important element of monitoring the overall performance of Massachusetts' health care delivery system. Historically, Massachusetts has an agenda of quality improvement through a combination of public and private initiatives, with strong commitment from providers and payers. Massachusetts is and has long been a national leader in providing comprehensive access to high-quality health care services as compared with the nation. For example, Massachusetts ranked 7th in the nation according to the Commonwealth Fund's State Health System Ranking 2009 Score Card in overall quality performance.[55] Massachusetts was in the top quartile for access to services, prevention and treatment, equity, and healthy lives, although the state was in the third quartile in avoidable hospital use.[55] Continued examination of quality with a focus on continuous improvement is a key element of the Commission's work. Chapter 224 is clear that savings must be paired with quality improvements over time to enhance the overall performance of the health care system.

In reviewing quality performance, indicators are often categorized into structure, process, and outcome measures: structure measures describe attributes of an organization and its professionals related to their capacity to deliver high-quality care; process measures describe how well providers follow evidence-based guidelines; and outcome measures describe the health status of a patient resulting from the care delivered. As the field of quality measurement has progressed, there has been increased emphasis on the use of outcome measures. For most outcome measures of quality performance examined, Massachusetts ranks above average, but below the 90th percentile as compared to all states (**Table 1.11**). These measures demonstrate strong performance, but also opportunity for continued quality improvement.

How were these outcome measures selected?

CHIA and its Statewide Quality Advisory Committee (SQAC) are tasked with developing a Standard Quality Measure Set (SQMS) that can be used to reliably assess each health care facility, provider type, and medical group in the state. The SQAC and the SQMS were established through Chapter 288 of the Acts of 2010 to promote improved alignment and transparency in quality measurement. Since 2011, SQAC members, including subject-matter experts and market participants, have carefully evaluated more than 300 measures on factors such as ease of data collection, alignment with current state, federal, and private reporting efforts, and utility to providers and consumers. The SQMS, "a tool for multiple stakeholders to drive quality improvement and inform value-based decision making to promote a more efficient and effective health care system," offers an evidence-based framework from which we have selected measures for inclusion in this report. All outcome measures examined here were selected from this set. Some domains, such as behavioral health, have limited available outcome measures; efforts are underway in Massachusetts and other states to improve measurement in these domains.

Table 1.11: Condition and procedure quality measures compared to the U.S.

Units vary by measure, 2009-2011

	MA	U.S.	90th percentile	Year
Prevention and population health				
Childhood immunization status	76%	61%	72%	2010
Low birth weight rate	8%	8%	7%	2010
Rate of older adults receiving flu shots	73%	70%	75%	2010
Rate of female adolescents receiving HPV vaccine	41%	24%	42%	2010
Chronic care				
Rate of cholesterol management for patients with cardiovascular conditions	92%	89%	94%	2010
Rate of controlling high blood pressure	71%	63%	74%	2010
Rate of diabetes short-term complications admissions (adult)	48 per 100,000	58 per 100,000	39 per 100,000	2009
Number of admissions for CHF	374 per 100,000	338 per 100,000	199 per 100,000	2009
Number of adults admitted for asthma*	140 per 100,000	114 per 100,000	57 per 100,000	2009
Number of COPD admissions	247 per 100,000	199 per 100,000	112 per 100,000	2009
Hospital readmission rates†				
Acute myocardial infarction readmission rate	20%	20%	N/A	2011
Pneunmonia readmission rate	19%	18%	N/A	2011
Heart failure readmission rate	26%	25%	N/A	2011
Hospital mortality rates†				
Acute myocardial infarction mortality rate	15%	16%	N/A	2011
Pneunmonia mortality rate	11%	12%	N/A	2011
Heart failure mortality rate	10%	11%	N/A	2011
Patient safety				
Rate of iatrogenic pneumothorax (risk-adjusted)	0.41 per 1,000	0.42 per 1,000	N/A	2009-2011
Rate of postoperative respiratory failure	6.6 per 1,000	8.3 per 1,000	N/A	2009-2011
Rate of central venous catheter-related blood stream infections	0.28 per 1,000	0.39 per 1,000	N/A	2009-2011
Patient experience				
Patients at each hospital who reported that "yes" they were given information about what to do during recovery	87%	85%	88%	2011
Patients who reported that staff "always" explained about medicines before giving it to them	64%	64%	67%	2011
Patients who reported that their pain was "always" well controlled	71%	71%	73%	2011
Patients who reported that their nurses "always" communicated well	79%	78%	81%	2011

*Admissions for asthma per 100,000 population, age 18 and over. NQF measure counts all discharges of age greater than 18 and less than 40 years old.

†Readmission and mortality rates are only for Medicare population.

SOURCE: Massachusetts Health Quality Partners; Kaiser Family Foundation; Agency for Healthcare Research and Quality; Massachusetts Immunization Action Partnership; Centers for Disease Control and Prevention; Centers for Medicare & Medicaid Services; Center for Health Information and Analysis; HPC analysis

What is Massachusetts doing to assess its health care resources and ensure access?

Chapter 224 established a statewide Health Planning Council, which is charged with establishing a state health resource plan. (By statute, the Commission is represented on this council.) In developing the plan, the council will inventory "health resources," including facilities, equipment, and professionals, project five-year demand for such resources, and establish a plan that ensures adequate capacity across the state to meet the population's needs and provide meaningful access.

In the first year, the council has focused on behavioral health resources, since this service line is known to have continuing challenges in capacity and access. In its future work, the council will analyze primary care, acute care, and post-acute care.

Nonetheless, in some cases limitations in measuring outcomes make process measures useful as a proxy. Other reports have demonstrated excellent performance on process measures across the state. Massachusetts providers achieve excellent performance on primary care process measures, with the statewide average exceeding the national average on 24 of 25 process measures reported by Massachusetts Health Quality Partners (MHQP) and surpassing the national 90th percentile on 14 of 25 measures.[56] Similarly, in the hospital setting, nearly all Massachusetts provider systems performed at or above national averages on 10 CMS process-of-care measures.[13]

1.4.3 Access to care

Massachusetts has the highest rate of insurance coverage in the country, with 97 percent of residents insured.[13] Massachusetts also performs well in the use of preventive services and in access to physician care: in the last year, nearly four-fifths of residents sought preventive care and all but 12 percent of residents visited a physician (**Table 1.12**).[xv] Still, there are known gaps in access to care in particular service lines, such as behavioral health (see sidebar **"What is Massachusetts doing to assess its health care resources and ensure access?"**).[27]

Although the state enjoys near universal coverage, the costs of this coverage and the out-of-pocket costs for deductibles, co-payments, and non-covered services can represent a significant financial burden for families in accessing care. From 2009 to 2011, the average per member premiums for commercial health insurance grew 9.7 percent, while the value of the benefits declined by 5.1 percent.[13] APCD data show that out-of-pocket costs represent six to seven percent of commercial enrollees' claims-based medical expenditures.

While Massachusetts has achieved strong access overall, significant disparities in access to care remain based on income, race and ethnicity, and other socioeconomic factors.[57,58,59] These are an area of interest for the Commission in future work, and the APCD is a particularly useful dataset to conduct these types of analyses.

Table 1.12: Health care access measures in Massachusetts

Units vary by measure

	2009	2010	2011
Structural access			
Residents without a doctor's visit in last 12 months	12%	12%	12%
Residents without a preventive care visit in last 12 months	22%	21%	22%
Residents with an ED visit	26%	25%	26%
ED visits that were non-emergent	34%	34%	31%
Residents with a non-emergent visit	9%	9%	8%
Residents with difficulty in obtaining care in last 12 months	23%	22%	22%
Financial access			
Average premiums	$384	$400	$421
Avoided care due to cost in last 12 months	21%	23%	24%
Having difficulty paying medical bills in last 12 months	15%	18%	18%

SOURCE: Center for Health Information and Analysis

[xv] Chapter 224 includes a number of reforms to improve access to primary care. The law expands the definition of primary care provider to include nurse practitioners and physician assistants and broadens the scope of practice for nurse practitioners in limited service clinics. In addition, it includes 3 programs to develop a broader primary care workforce: loan forgiveness for providers who care for underserved populations; grants to promote residency programs at community health centers; and loan grants for providers serving at a community health center.

1.5 Conclusion

Per capita health care spending in Massachusetts is the highest of any state, 36 percent above the United States average in 2009. Massachusetts devoted 16.6 percent of its economy to personal health care expenditures in 2012, compared with 15.1 percent for the nation. Higher spending results from higher utilization and higher prices, and is concentrated in two categories of service: hospital care and long-term care and home health. This higher per capita spending is consistent across all payer types.

Between 2001 and 2009, per capita health care spending in Massachusetts grew at an accelerated rate, increasing the difference between Massachusetts and the U.S. average from 26 percent to 36 percent. This increased difference was driven primarily by faster growth in commercial prices, as hospital utilization levels compared to the U.S. average were relatively stable over that time period.

In recent years, spending growth in Massachusetts has slowed in line with slower national growth. This recent slower health care growth coupled with faster economic growth has marginally decreased the proportion of the economy that Massachusetts spends on health care. However, historic evidence suggests sustaining lower growth rates will require concerted effort. Past periods of slow health care growth in Massachusetts, such as the 1990s, have been followed by periods of higher growth.

Massachusetts achieves high quality performance on most measures, although opportunities for improvement remain. There is broad overall access to care, with low uninsured rates and a high proportion of residents who have visited a health care provider in the past year.

Significant trends are occurring in the provider and payer market. For providers, the delivery system is growing increasingly concentrated in several large systems, with a larger proportion of discharges occurring from major teaching hospitals and hospitals in their systems. Many provider organizations seek to re-orient care delivery around new models for patient-centered, accountable care through a variety of organizational structures. Still, misaligned payment incentives, persistent barriers to behavioral health integration, and limited data and resources are significant challenges.

In the payer market, commercial payers are pursuing demand-side innovation through products like high-deductible health plans and tiered or limited network plans intended to involve consumers in making value-based decisions. In addition, public and commercial payers are increasingly implementing provider contracts that aim to alter supply-side incentives through alternative payment methods. These methods, in contrast to fee-for-service payments, are designed to support and financially reward providers for delivering high-quality care while holding them accountable for slowing future health care spending increases. However, there are significant challenges in implementation, including a shift in the commercial market to PPO products, which currently do not feature alternative payment methods, and wide variation in contracts across payers and across providers.

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2. Hospital Operating Expenses

Hospitals in Massachusetts vary greatly in their level of operating efficiency, with some capable of delivering high-quality care with lower operating expenses.

Hospitals face significant operating expenses in delivering care. Improving the operating efficiency of hospitals enables them to deliver care more affordably. If hospitals with higher expense structures could successfully implement strategies to reduce operating expenses, then the overall health care system could maintain equal or better quality of care while reducing total expenditures.

To this point, our focus has been on payer and consumer payments to providers for delivering health care services. In this chapter we shift to an examination of the expenses of acute hospitals[i] in providing those services, or operating expenses. We first compare hospital operating efficiency by examining differences in expenses and quality performance (see sidebar **"What does operating efficiency mean for hospitals?"**). We then examine the different margins hospitals earn from public and commercial payers and the variation of these margins across hospitals. Finally, we examine the composition of hospital operating expenses and discuss strategies that hospitals may use to improve their efficiency.

What does operating efficiency mean for hospitals?

We use operating efficiency in this chapter to describe how productively hospitals make use of their input resources – such as facilities, labor, and supplies – to deliver care. We describe a hospital that is able to deliver similar services at equivalent quality while incurring fewer expenses than another hospital as being relatively efficient. There are many practices that hospitals may use to reduce operating expenses and improve efficiency (see sidebar "**What types of strategies are hospitals pursuing to reduce their operating expenses?**").

2.1 Variation in hospital operating efficiency

Operating expenses vary greatly by hospital. Analysis of cost reports submitted by Massachusetts hospitals illustrates this variation[ii] (see **Technical Appendix B1: Data sources** for discussion of the hospital cost reports data set). Even after adjusting for the varying complexity of needs of patients treated by each hospital and for different regional wage levels, hospitals with higher levels of operating expenses spent 23 percent more to provide the same services than those with lower levels of operating expenses (**Figure 2.1**).[iii] This difference represented thousands of dollars in additional expenses per hospitalization for those hospitals with higher expense structures.

One oft-cited theory for the cause of this variation is that certain types of hospitals, such as those that teach physician residents and fellows, must incur additional expenses to support their mission.[iv] However, the difference in median expenses per discharge between teaching hospitals and all hospitals ($1,030) was less than the difference between individual teaching hospitals ($3,107 between the 75th percentile and 25th percentile teaching hospitals).[v] Moreover, there were a number of teaching hospitals that incurred fewer expenses per discharge than the statewide all-hospital median of approximately $9,000 per discharge (**Figures 2.1, 2.2**). A similar analysis for disproportionate share hospitals (DSH)[vi] found that these hospitals had a median operating expense level comparable to the median for all hospitals ($9,055 compared with $9,053), but that there was broad variation between DSH hospitals ($2,060 between the 75th percentile and 25th percentile).

Evaluating efficiency also requires understanding the impact of operating expense level on the quality of care

[i] Those hospitals licensed under MGL Chapter 111, section 51, for whom a majority of beds are medical-surgical, pediatric, obstetric, or maternity.

[ii] While hospital cost reports have known limitations and accounting approaches differ from hospital to hospital, these data represent the best information available at a statewide level for analysis of hospital operating expenses. Analyses presented here describe general trends and are not intended to characterize the performance of individual institutions.

[iii] In describing the degree of variation, we used the 25th and 75th percentile hospitals to exclude outliers.

[iv] Medicare provides graduate medical education (GME) funding to support resident training expenses.

[v] We define teaching hospitals based on the Medicare Payment Advisory Commission (MedPAC) definition of major teaching hospital. Major teaching hospitals are those that train at least 25 residents per 100 hospital beds.

[vi] DSH refers to hospitals with 63% or more of patient charges attributed to Medicare, Medicaid, and other government payers, including Commonwealth Care and Health Safety Net.

Figure 2.1: Inpatient operating expenses per discharge* for all Massachusetts acute hospitals

Dollars per case mix- and wage-adjusted discharge, 2012

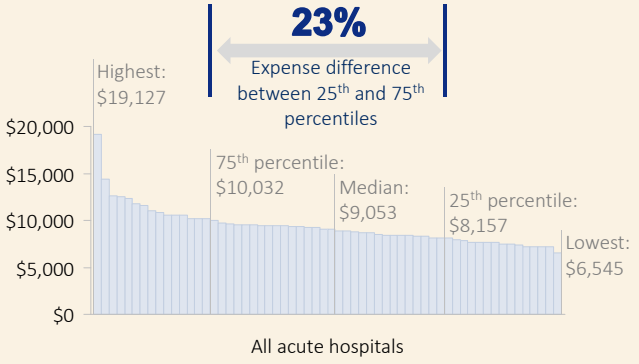
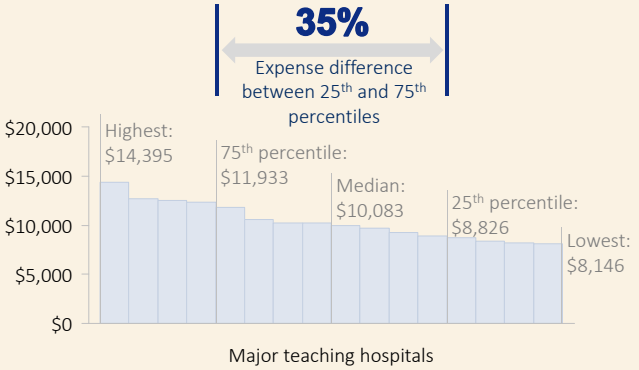


Figure 2.2: Inpatient operating expenses per discharge* for major teaching hospitals in Massachusetts

Dollars per case mix- and wage-adjusted discharge, 2012



*Inpatient patient service expenses divided by inpatient discharges. Adjusted for hospital case mix index (CHIA 2011) and area wage index (CMS 2012).

SOURCE: Center for Health Information and Analysis; Centers for Medicare & Medicaid Services; HPC analysis

delivery and patient safety. We examined performance by Massachusetts hospitals across select indicators of quality: excess readmission ratio, mortality rate, and process-of-care measures. For each measure of hospital quality, certain hospitals achieved better performance while maintaining lower operating expenses (**Figures 2.3, 2.4, 2.5**). Opportunities exist across all measures examined for hospitals to achieve higher quality performance at their current operating expense level or to reduce operating expenses while sustaining quality performance. These results suggest that some hospitals may have structures or practices that allow them to deliver care more efficiently. For example, studies have demonstrated that hospitals practicing effective management techniques have lower mortality rates and stronger financial performance.[1] Lower-efficiency hospitals could benefit from critical examination of their cost structures and should consider adopting evidence-based practices to reduce their operating expenses while maintaining or improving quality (see sidebar **"What types of**

Figure 2.3: Quality performance relative to inpatient operating expenses per admission: excess readmission ratio

Excess readmission ratio versus dollars per case mix-adjusted discharge*

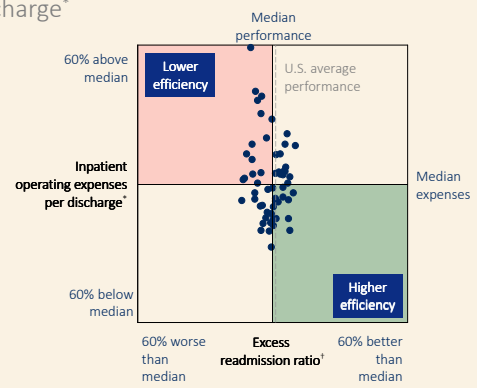


Figure 2.4: Quality performance relative to inpatient operating expenses per admission: mortality rate

Composite mortality rate versus dollars per case mix-adjusted discharge*

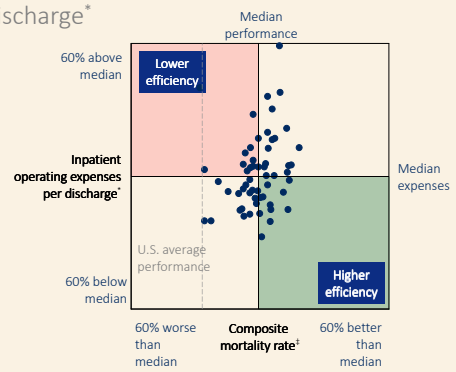
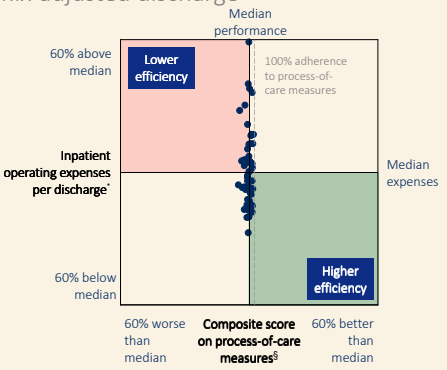


Figure 2.5: Quality performance relative to inpatient operating expenses per admission: process-of-care measures

Composite of process-of-care measures versus dollars per case mix-adjusted discharge*



*2012 inpatient patient service expenses divided by inpatient discharges. Adjusted for hospital case mix index (CHIA 2011) and area wage index (CMS 2012).

†Composite of risk-standardized 30-day Medicare excess readmission ratios for acute myocardial infarction, heart failure, and pneumonia (2009-2011). The composite rate is a weighted average of the three condition-specific rates.

‡Composite of risk-standardized 30-day Medicare mortality rates for acute myocardial infarction, heart failure, and pneumonia (2009-2011). For each condition, mortality rates were normalized so that the Massachusetts average was 1.0. The composite mortality rate is a weighted average of the three normalized, condition-specific mortality rates.

§Average across 10 process-of-care measures (CMS 2012): SCIP-Inf-1; SCIP-Inf-2; SCIP-Inf-3; SCIP-Inf-9; SCIP-Inf-10; AMI 2; AMI 8-a; PN 6; HF 2; and HF 3. Detail on measures available in Technical Appendix A2: Hospital Operating Expenses.

SOURCE: Center for Health Information and Analysis; Centers for Medicare & Medicaid Services; HPC analysis

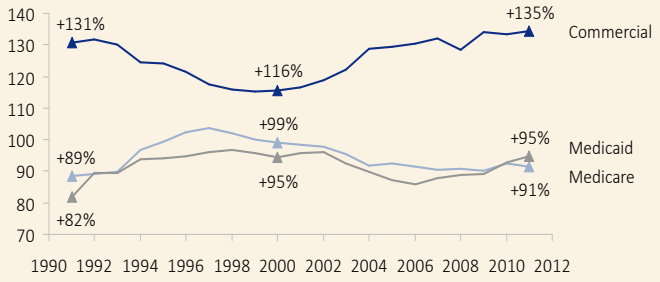
strategies are hospitals pursuing to reduce their operating expenses?").

2.2 Operating margins by payer and hospital market position

Hospitals' operating expenses and operating margins are influenced by market dynamics and the level of payments they receive from public and commercial payers. Differences in the level of payments made to hospitals by commercial payers compared with those paid by the public payers (Medicare and Medicaid) have been well-documented. Nationally, hospitals have typically made money on their commercial business while losing money on their Medicare and Medicaid business (**Figure 2.6**).

Figure 2.6: Aggregate U.S. hospital payment-to-cost ratios for commercial payers, Medicare, and Medicaid*

Percent of total expenses, 2011



* Medicaid and Medicare figures include disproportionate share payments.

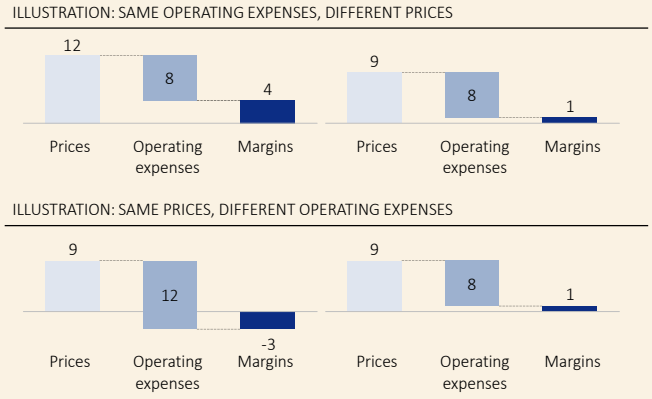
SOURCE: Avalere Health analysis of American Hospital Association Annual Survey data, 2011, for community hospitals

Massachusetts hospitals experience similar differences, but operating margins vary materially by hospital for both commercial and public payer business. Differences in the operating margins between hospitals can be driven by differences in the revenues they receive for services, by differences in the expenses they incur to deliver those services, or by both factors (**Figure 2.7**). For public payers, price levels are comparable across hospitals because Medicaid and Medicare set fee schedules based on established formulas.[vii] As a result, differences in operating margins between hospitals for public payers are largely driven by differences in expenses.

For commercial payers, the differences in margins include large differences in prices paid. CHIA's relative price reporting and analyses by the AGO have demonstrated a wide variation in commercial prices paid to Massachusetts hospitals[2,3]

[vii] These formulas account for factors like regional wages, costs associated with a teaching mission, and the case mix of patients using the hospital.

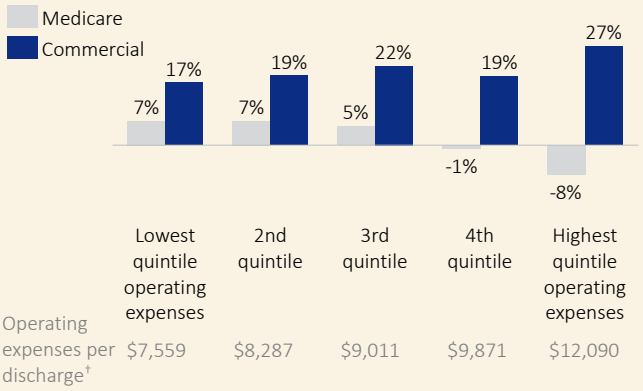
Figure 2.7: Illustrative examples of margin differences driven by prices and operating expenses



Hospital cost reports suggest that some Massachusetts hospitals earn positive margins from public payers, while others lose more than 30 cents per dollar of revenue on the same payers.[viii] Similarly, some hospitals earn more than 30 cents per dollar of revenue on commercial payers, while others earn just a fraction of that. In Massachusetts, when grouped by expense levels, the groups of hospitals that earn the largest margins on revenue from commercial payers often report the largest losses on revenue from public payers (**Figure 2.8**).

Figure 2.8: Operating margins by payer type for hospitals at different operating expense levels

Operating income as proportion of net patient service revenue,* 2012



*Operating income defined as total net patient service revenue less total patient service expenses. Payer-specific expenses are estimated by applying hospital-specific cost-to-charge ratios to hospital's charges by payer.

†2012 inpatient patient service expenses divided by inpatient discharges. Adjusted for hospital case mix index (CHIA 2011) and area wage index (CMS 2012).

SOURCE: Center for Health Information and Analysis; HPC analyss

[viii] This is on a fully allocated expense basis determined by average costs, factoring in indirect expenses and overhead. In some cases where negative margins are reported on a fully allocated expenses basis, Medicare and Medicaid payments may exceed direct care expenses.

What types of strategies are hospitals pursuing to reduce their operating expenses?

Hospitals in Massachusetts and around the nation are implementing various efforts to improve their operational efficiency with the goal of delivering high-quality care while incurring lower expenses. Below we discuss three examples of strategies that have been successfully implemented at certain hospitals. For a particular hospital, opportunities may be different than those described below, but these examples demonstrate the range of levers that are available to hospitals to improve their operating efficiency.

Procurement and supply chain management

Hospitals purchase a large variety and volume of goods, materials, and equipment. Purchased items range from surgical gloves to drugs, imaging machines, and major surgical implants. The procurement of these items is often encumbered by various forms of inefficiency, including[4]:

- Lack of coordination across hospitals in a system, with duplicative purchasing and materials management departments that fail to leverage system scale to negotiate lower prices,
- Lack of alignment across clinicians in a department, resulting in orders of similar products from different companies, thereby missing opportunities to save through bulk-volume purchasing, and
- Ineffective inventory management, resulting in stock-outs or delays for some items and large inventory levels for others.

Reducing inefficiencies in procurement can substantially reduce the expenses of delivering care. Orthopedic and cardiac implants, for instance, can represent 50 to 80 percent of the total expenses of an acute procedure.[5] Through improved management, hospitals can potentially reduce the spending across their entire supply chains by an estimated five to 15 percent.[6]

Lean operations

"Lean" management principles are most widely associated with the Toyota Production System, which seeks to reduce waste in the production process to increase value for the customer. Over the past decade, a number of organizations have translated the same lean principles to the hospital setting. The benefits of lean processes – including fewer medication errors, a decrease in health care-associated infections, less nursing time away from the bedside, faster operating room turnover, improved care-team communication about patients, and faster response time for emergency cases – not only improve patient care but also increase employee engagement, labor productivity, and operating margins.[7] Successful implementations of lean programs in hospital systems outside Massachusetts have shown significant improvements in efficiency, with one hospital system reporting savings equivalent to three to five percent of its annual revenue within three years and another achieving a 36 percent improvement in labor productivity.[8,9]

Still, the literature contains many cases of (and explanations for) hospitals' failures in implementing lean principles, and statistically rigorous evidence of the potential impact is limited.[10,11] Some systems that have achieved great success in improving efficiency in their core markets have encountered difficulties in trying to scale their approach to new markets.[12] Although efforts to adopt lean principles do not guarantee success, with careful implementation Massachusetts hospitals may realize efficiencies through established successful lean programs.

Cost accounting

In their efforts to reduce operating expenses, hospitals are often limited by the information available from their established cost accounting practices. Many Massachusetts hospitals have not implemented detailed cost accounting systems, and thus the operating expenses associated with a particular procedure are often not measured directly.[3] Rather, the hospitals calculate a hospital- or department-wide ratio of total expenses to total charges and then multiply this ratio by the amount billed for that procedure to obtain an expense value. Some hospitals attempt a more accurate allocation by using internally developed relative value units based on the complexity of the procedure, but such allocation methods introduce other measurement errors. Without direct measurement of expenses in delivering care, hospitals encounter difficulties in managing and improving their expenses. To remedy these problems, several health systems have been pursuing more rigorous approaches to expense measurement, using actual data on the time spent by clinicians and support personnel, and also of the space, equipment, and supplies used to treat patients for a specific condition.[13,14]

In the future, improved accounting practices will become increasingly important as hospitals seek to reduce their per-procedure operating expenses to enable more affordable care delivery. Benchmarking data available through state reporting programs or provider data consortiums can also support operational improvement efforts.

Some hospitals seek to negotiate greater payments from commercial payers to make up for these public payer shortfalls. Previous analyses have shown that hospitals are not uniformly successful in realizing this shift in source of revenue (often referred to as "cost-shifting"), as Massachusetts hospitals with high public payer mix on average receive *lower* relative commercial prices than hospitals with low public payer mix.[2] Whether a hospital is able to negotiate higher commercial prices when it faces a decline in public payer revenue is most closely linked to the hospital's relative market leverage, not its relative mix of public payer reimbursement.[15]

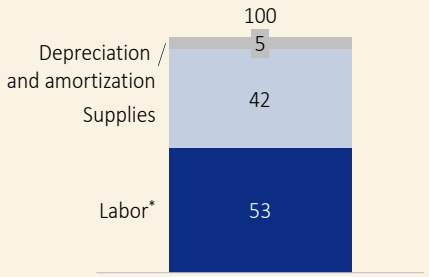
This impacts operating expenses over time as hospitals with stronger market leverage can earn higher revenues from commercial payers and therefore have less pressure to constrain their expenses.[16,17] Meanwhile, hospitals with limited market leverage receive lower rates of commercial payer reimbursement and, under greater financial pressure, tend to be more aggressive at maintaining lower operating expenses.[ix] Nationally, hospitals with lower expense structures fare better at Medicare and Medicaid levels of reimbursement. Analysis of the hospital cost reports in Massachusetts shows consistent results. These findings reinforce the importance of monitoring overall market performance and competitiveness.

2.3 Composition of hospital operating expenses

In 2012, spending on labor constituted more than half of all operating expenses for Massachusetts hospitals (**Figure 2.9**).[x] In some hospitals, the staff is directly paid for by the hospital in the form of salaries and benefits; in others, hospitals outsource certain roles to companies and pay for the labor through a purchased services contract.

It is important to better understand the relationship of labor expenses, supply expenses, and other operating expenses with quality of care in order to assess how hospitals can become more efficient. Current information, however, is limited for conducting such an analysis. Available cost reports contain only spending within a hospital, excluding expenses incurred through affiliated provider organizations in the hiring of medical staff and other personnel.n the current structure, hospitals report similar expenses differently. Moreover, available data on hospital capital expenses are limited. Improved data are needed to further analyze high-efficiency models and best practices, which could support provider organization improvement efforts through actionable benchmarks. In the future, we will continue to examine this area as improved data become available through CHIA data collection efforts and other programs.

Figure 2.9: Breakdown of hospital operating expenses
Percent of direct expenses by category, 2012



* Labor expense category is composed of salaries and benefits, physician compensation paid directly by hospitals, and purchased services.
SOURCE: Center for Health Information and Analysis; HPC analysis

2.4 Conclusion

Hospitals vary greatly in their level of operating efficiency, with some capable of delivering high-quality care with lower expenses. These differences between higher- and lower-expense hospitals amount to several thousand dollars per discharge. There are multiple strategies to reduce operating expenses that are being explored around the country, which, if adopted, could enable Massachusetts hospitals to deliver high-quality care at more affordable prices.

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[ix] Some reductions in operating expenses may reflect efficiency improvements, while others may be of potential concern. For example, hospitals with limited revenue may maintain lower operating expenses by deferring investment in facilities and equipment, which could deepen competitive disadvantages over time.
[x] Labor expenses shown here include direct spending on salaries and benefits, spending on purchased services, and spending on physician compensation that is paid directly by the hospital, rather than a separate physician organization.

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3. Wasteful Spending

Of total health care spending in Massachusetts, an estimated 21 to 39 percent ($14.7 to $26.9 billion in 2012) could be considered wasteful.

Wasteful spending in health care is important because it represents spending that does not return value and in some cases causes harm. According to the Organization for Economic Co-operation and Development (OECD), the United States spends approximately two-and-half times as much on health care per capita as other industrialized nations without a corresponding gain in outcomes.[1]

Experts define "wasteful spending" in many ways. In this chapter, we define wasteful spending as spending in the provision of health services that could be eliminated without harming consumers or reducing the quality of care people receive.

We first estimate the proportion of health care spending that can be considered wasteful. The results offer a sense of the magnitude of potential savings that could be achieved without any decrease in the quality of care. We then examine a number of specific wasteful spending areas and for each provide an estimate of the dollars wasted.

3.1 Estimate of wasteful spending in the system

A variety of approaches have been used to estimate how much spending is wasteful in the U.S. health care system (**Table 3.1**).[2,3,4,5,6,7] The various approaches all estimate several categories of waste: spending on services that lack evidence of producing better health outcomes compared with less-expensive alternatives; the provision of duplicative or unnecessary health care goods and services; the underuse of preventive care; and spending to treat avoidable medical injuries and illnesses.

Using a similar approach, we estimate that wasteful spending in Massachusetts was $14.7 to $26.9 billion in 2012, representing 21 to 39 percent of total health care spending (see **Technical Appendix A3: Wasteful Spend-**

Table 3.1: Estimates of wasteful spending in the U.S. health care system

Percent of U.S. health care spending in year of estimate

	Year	Estimate	Types of wasteful spending examined	Approach
PricewaterhouseCoopers	2005	54%	Behavioral, clinical, and operational inefficiencies	Literature review, interviews with health industry executives and government officials, and survey of 1,000 US consumers
RAND Corporation	2008	50%	Administrative, operational, and clinical	Meta-analysis of research on waste
McKinsey Global Institute	2008	31%	Spending in excess of expected level of spending based on national wealth	Comparison of health care spending and income by country
Institute of Medicine	2012	30%	Unnecessary services, delivery inefficiencies, high prices, unnecessary administrative costs, missed prevention opportunities, and fraud and abuse	Meta-analysis of literature; expert interviews
Berwick and Hackbarth JAMA article	2011	27%	Overtreatment, failures of care delivery, failures of care coordination, pricing failures, administrative complexity, and fraud and abuse	Meta-analysis of literature
NEHI	2008	27%	Emergency department overuse, antibiotic overuse, patient medication non-adherence, vaccine underuse, hospital readmissions, hospital admissions for ambulatory care sensitive conditions, and medical errors	Meta-analysis of expert interviews, case studies, and a review of relevant literature

Source: PricewaterhouseCoopers; RAND Corporation; McKinsey & Company; Institute of Medicine; Journal of the American Medical Association; NEHI; HPC analysis

Table 3.2: Selected examples of wasteful spending in Massachusetts

Dollars

	Estimate of wasteful spending	Year	Definition of category
Opportunities for coordinated action across care settings			
Preventable acute hospital readmissions	$700M	2009	Hospital readmissions that could have been prevented through quality care in the initial hospitalization, adequate discharge planning, adequate post-discharge follow-up, or improved coordination between inpatient and outpatient health care teams
Unnecessary ED visits	$550M	2010	Visits to the emergency room that could have been avoided with timely and effective primary care
Opportunity for hospital action			
Health care-associated infections	$10 to $18M	2011	Infections contracted while patients are in a hospital receiving health care treatment for other conditions
Opportunities for physician and patient action			
Early elective inductions	$3 to $8M	2012	Elective inductions before 39 weeks, which increase the health risks for newborn babies and dramatically raise the likelihood of those infants being admitted to neonatal intensive care
Inappropriate imaging for lower back pain	$1 to $2M	2011	Diagnostic imaging (X-rays, CT scans, and MRIs) used against clinical guidelines in office visits for lower back pain

SOURCE: Massachusetts Division of Health Care Finance and Policy; Massachusetts Department of Public Health; Massachusetts All-Payer Claims Database; Choosing Wisely; Leapfrog Group, American Journal of Obstetrics and Gynecology; Journal of the American Medical Association Internal Medicine; HPC analysis

ing). This estimate, which includes both clinical activities and structural characteristics that contribute to wasteful spending, was based on national estimates augmented with Massachusetts-specific data where available.

3.2 Opportunities identified for wasteful spending reduction

Our estimate of wasteful spending in Massachusetts suggests significant opportunities for reducing spending. To provide guidance on how to capture these opportunities, we identify specific measurable types of wasteful spending in the Massachusetts health care system. This analysis has two goals:

- Cataloguing instances of wasteful spending and their relative size to support the health care industry in prioritizing areas for waste-reduction efforts
- Developing an evidence-based foundation for policy efforts to support reducing wasteful spending

We selected five examples based on their prevalence in policy discussions and research, insight from experts in the field, and the availability of data (**Table 3.2**). These five examples span three categories: large opportunities requiring coordinated action across care settings, opportunities addressable by hospitals, and opportunities addressable by individual physicians and patients. The estimates presented here are based on a review of previously published estimates and on our analyses of newly available data. Each example represents an opportunity not only to reduce spending, but also to improve the quality of care delivered.

3.2.1 Preventable acute hospital readmissions

A readmission occurs when a patient is admitted to a hospital within a defined period of time after being discharged from an index hospitalization. Readmissions are often viewed as failures of either care delivery (such as incomplete treatment or poor care of the underlying problem) or care coordination (such as incomplete discharge planning or inadequate access to post-acute care).[8] Readmissions are important not only because they are indicators of lower quality, but also because each additional hospital admission is expensive.[9] The federal government has estimated spending on readmissions for Medicare patients alone at $26 billion annually, of which more than $17 billion, or 65 percent, is preventable.[10]

The Massachusetts average readmission rate is higher than the national rate in the Medicare population for major conditions.[i] Moreover, the Massachusetts Medicare average excess readmissions ratio[ii] is higher than the national average.[11] Within Massachusetts, readmissions rates

[i] Readmissions measures cover three conditions: acute myocardial infarction, heart failure, and pneumonia.

[ii] The excess readmissions ratio is a measure of observed readmissions relative to those expected based on a hospital's case mix.

Figure 3.1: Readmissions within 30 days for acute myocardial infarction for Massachusetts acute hospitals

Risk-standardized excess readmission ratio for Medicare beneficiaries by hospital, 2009-2011

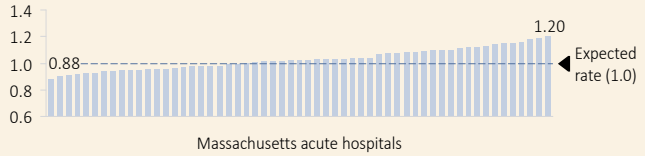


Figure 3.2: Readmissions within 30 days for heart failure for Massachusetts acute hospitals

Risk-standardized excess readmission ratio for Medicare beneficiaries by hospital, 2009-2011

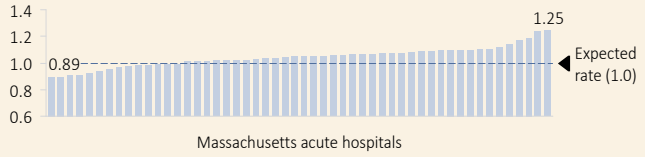
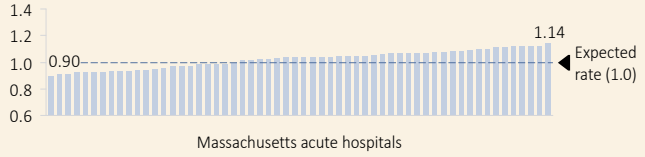


Figure 3.3: Readmissions within 30 days for pneumonia for Massachusetts acute hospitals

Risk-standardized excess readmission ratio for Medicare beneficiaries by hospital, 2009-2011



SOURCE: Centers for Medicare & Medicaid Services

vary, with some hospitals below the U.S. average (**Figures 3.1, 3.2, 3.3**).

Readmissions can be categorized based on whether they are preventable.[iii] One widely used definition of a preventable readmission is "if there was a reasonable expectation that it could have been prevented by one or more of the following: (1) the provision of quality care in the initial hospitalization, (2) adequate discharge planning, (3) adequate postdischarge follow-up, or (4) improved coordination between inpatient and outpatient health care teams."[10] For example, the expected readmission rate for surgical procedures is quite low, implying that many readmissions of this type may be preventable.[10] In 2011, a CHIA study found that 8.9 percent of all hospitalizations in Massachusetts resulted in a potentially preventable readmission, with performance varying significantly by hospital (rates ranging from 5.6 to 13.9 percent).[12] The study estimated that these potentially preventable readmissions represented $704 million of spending in FY2009.[12]

A number of efforts are under way to reduce all types of preventable hospital readmissions at the federal and the state level. In 2012, for example, CMS launched the Readmissions Reduction Program, which financially penalizes hospitals that have excess readmissions based on their 30-day readmission rates for acute myocardial infarction, heart failure, and pneumonia.

In Massachusetts, the State Action on Avoidable Rehospitalizations (STAAR) Initiative has been working since 2009 to reduce avoidable readmissions and improve care transitions for patients and families.[13] A multi-state, multi-stakeholder approach, the STAAR Initiative has led to the formation of over 50 cross-continuum teams in Massachusetts, with hospitals, long-term care facilities, home health agencies, and physician offices committing to provide increased transparency into readmission rates and to drive improvement.[13] Another Massachusetts innovation in readmissions reduction is the Re-Engineered Discharge (RED) system, developed by researchers at the Boston University Medical Center. This set of activities and materials for improving the discharge process has proven to be effective in reducing readmissions and post-discharge ED visits.[14] Other Massachusetts stakeholders are working with nursing facilities to tailor and disseminate the INTERACT II (Interventions to Reduce Acute Care Transfers) toolkit, a set of clinical and educational resources that are intended to improve care within nursing facilities and to minimize transfers to the acute hospital that are potentially avoidable.[15] Many other efforts, such as the Delivery System Transformation Initiatives (DSTI), the Community-based Care Transitions Program (CCTP), and MassHealth's preventable readmissions policy, are also under way in Massachusetts.

3.2.2 Unnecessary emergency department visits

Visits to emergency departments (ED), which provide a wide range of health care services regardless of people's ability to pay or the severity of their condition, are another source of wasteful spending, specifically ED overuse. According to a 2012 CHIA report, ED overuse is defined as ED visits that are preventable or avoidable with timely and effective primary care.[16] Such visits can be classified into three types of categories:

- Non-emergent care,

[iii] Not all readmissions are preventable or undesirable. Even with high-quality, evidence-based care, some patients discharged from the hospital can be expected to encounter medical issues in the month after discharge that will require another hospitalization.

- Emergent care that could have been treated in a primary care setting, and
- Emergent care that requires an ED setting but that could have been prevented or avoided through earlier intervention.

These three categories of overuse account for approximately half of the total ED visits in Massachusetts. Effective interventions are needed to reduce the estimated $558 million in spending associated with preventable ED visits in Massachusetts in 2012.[16]

A number of potential interventions may reduce unnecessary ED utilization. Some of these involve increased access to primary care, through efforts like scope of practice changes, expansion of limited service clinics, workforce development, and development of patient-centered medical homes.[iv] Other interventions involve better management of those with chronic conditions who experience acute exacerbations requiring urgent attention. Accountable care models that promote better population health management, reward care coordination, and provide for better transitions of care have the potential to reduce this segment of ED use.

3.2.3 Health care-associated infections

Patients can sometimes contract an infection while they are in a hospital receiving health care treatment for other conditions – often referred to as nosocomial or health care-associated infections (HAIs).[17] In the United States, an estimated 1.7 million hospital patients – 4.5 out of every 100 admissions – experience HAIs, which cause or contribute to the deaths of nearly 100,000 people annually.[17] The most frequent type of HAI in the United States is urinary tract infection (36 percent of all HAIs), followed by surgical site infection (20 percent), and central line-associated bloodstream infection and ventilator-associated pneumonia (both 11 percent).[17] These HAIs can greatly harm the health of patients, sometimes requiring years of follow-up treatment, multiple surgeries, and permanent disability.

The ideal benchmark for HAIs is zero. While reduction efforts have successfully brought the occurrences of HAIs in Massachusetts down over the past few years, hundreds of these infections are still reported annually.[18] We estimate that these HAIs represented $10 to $18 million of wasteful spending in 2011.

3.2.4 Elective induction of labor before 39 weeks

When a woman is nearing the end of a pregnancy, she may have her labor induced rather than waiting for it to begin on its own. Labor induction is *indicated* when there are health concerns for the mother and/or child. But when the reason is non-medical, such as matters of convenience or preference, it is an *elective* labor induction. Evidence shows that elective inductions before 39 weeks increase the health risks for newborn babies and dramatically raise the likelihood of those infants being admitted to neonatal intensive care. In addition to these health concerns, early elective inductions also generate higher medical expenditures due to increased rates of costly Cesarean sections (C-sections) and neonatal intensive care unit (NICU) stays.[19]

5.9 percent of all births in Massachusetts were early elective inductions in 2012.[20] Although this rate is significantly improved from prior performance due to concerted efforts around the nation and in Massachusetts, there is still further room for improvement. We estimate that reducing this rate could save $3 to $8 million per year from a corresponding decrease in NICU stays.

Evidence from interventions piloted in certain hospitals suggests lower rates are feasible. A 2010 study of hospitals that implemented programs to reduce elective inductions found it possible to achieve rates of 1.7 to 4.3 percent, depending on whether the hospital implemented a "soft stop" policy –- in which physicians were discouraged from elective inductions, but compliance was not enforced – or a "hard stop" policy barring any elective induction.[21]

3.2.5 Overuse of diagnostic imaging for acute lower back pain

Nationally, acute lower back pain is the second-most common symptomatic reason for office visits to primary care physicians, and it is the most common reason for office visits to orthopedic surgeons, neurosurgeons, and occupational medicine physicians.[22] In many of these visits, patients receive an x-ray, CT scan, or MRI to diagnose the issue. But evidence shows that, within six weeks, 90 percent of episodes will resolve effectively regardless of whether patients receive an imaging test. Furthermore, these tests often trigger unnecessary interventions and

[iv] Chapter 224 includes a number of reforms to improve access to primary care. The law expands the definition of primary care provider to include nurse practitioners and physician assistants and broadens the scope of practice for nurse practitioners in limited service clinics. In addition, it includes three programs to develop a broader primary care workforce: loan forgiveness for providers who care for underserved populations; grants to promote residency programs at community health centers; and grants for providers serving at a community health center. Chapter 224 also charges the Commission with the certification of patient-centered medical homes.

lead to additional procedures that complicate recovery.[23]

Our analysis of claims data shows that 21 percent of Massachusetts patients with uncomplicated lower back pain received imaging studies against guidelines.[v] Inappropriate imaging studies for these diagnoses represent $1 to $2 million in annual spending. The cost of unnecessary care that can follow an imaging study may generate additional wasteful spending. Moreover, inappropriate imaging for other conditions may represent additional opportunities.

3.3 Conclusion

Analysis of wasteful spending in Massachusetts suggests that the magnitude of waste is 21 to 39 percent of personal health care expenditures, or $14.7 to $26.9 billion in 2012. Reducing wasteful spending represents an important opportunity to slow the growth in health care expenditures for Massachusetts residents. Already, many efforts are under way across the nation to identify and address specific areas of clinical waste.[vi] As these efforts take shape, it will be important to ensure that investments made generate a sufficient return in the form of lower spending and that the savings generated translate into lower premiums, shared with the households and businesses that purchase health care.

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[vi] Examples include efforts led by the National Priorities Partnership, the ABIM Choosing Wisely Campaign, the Institute for Clinical Systems Improvement (ICSI), and the Institute for Healthcare Improvement (IHI). These groups produce guidelines and lists of medical services and treatments that do not represent evidence-based practice.

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4. High-Cost Patients

Five percent of patients account for nearly half of all spending among the Medicare and commercial populations in Massachusetts. Of these patients, 29 percent remain in the top five percent by spending the following year.

One-fourth of all patients represent over 85 percent of total expenditures in the U.S. health care system.[1] This group includes many medically complex patients, for whom improved management may yield better outcomes at lower costs. Accurately identifying and focusing interventions for this population has the potential to produce savings and quality returns on investment. For example, reducing the spending for this population by 3.5 percent would save an equivalent amount as a 20 percent reduction for the other three-fourths of the population.

In this chapter, we define "high-cost patients" as the top five percent of patients in our sample by spending in a given year and "persistently high-cost patients" as high-cost patients who remain in the top five percent the following year.[i,ii] Since their costs recur in multiple years, persistently high-cost patients may be easier to identify and their high costs present a larger savings opportunity.

The sample for this analysis covers patients enrolled with Medicare and with the three largest commercial Massachusetts payers. This sample does not include Medicaid or pharmacy costs due to current data limitations. Given the known concentration of MassHealth spending among certain groups of beneficiaries, such as disabled adults and seniors, future analysis of MassHealth data is of particular interest to the Commission.[2]

In this chapter, we first analyze the concentration of spending in Massachusetts, the persistence of spending among high-cost patients, and the characteristics and predictors of high-cost and persistently high-cost patients. Next, we provide examples of interventions and strategies intended to reduce costs for high-cost and persistently high-cost patients.

Table 4.1: Spending concentration in Massachusetts

Claims-based expenditures (excluding pharmacy spending), dollars, 2010

	Medicare		Commercial	
	Expenditure threshold*	Percent of total expenditures	Expenditure threshold*	Percent of total expenditures
Top 1%	$99,600	15.3%	$48,900	22.4%
Top 5%	$45,800	42.0%	$16,500	45.0%
Top 10%	$26,900	60.1%	$9,600	58.6%
Top 20%	$11,000	78.1%	$4,900	73.3%
Top 50%	$2,600	94.5%	$1,600	91.8%

*Minimum expenditures for patient in that group.

SOURCE: All-Payer Claims Database; HPC analysis

4.1 Concentration of spending

In 2010 in Massachusetts, high-cost patients accounted for 45 percent of spending among the commercial population and 42 percent among the Medicare population (**Table 4.1**). National results for all-payer data show a comparable concentration of spending.[1] Spending for the average high-cost patient in 2010 was 13.8 times greater than the average for all other patients among the Medicare population; the comparable figure was 15.6 times greater among the commercial population.

[i] We define high-cost based on level of spending in claims-based medical expenditures. Higher spending may be due to greater medical complexity, higher utilization, or use of higher-priced providers (provider mix).

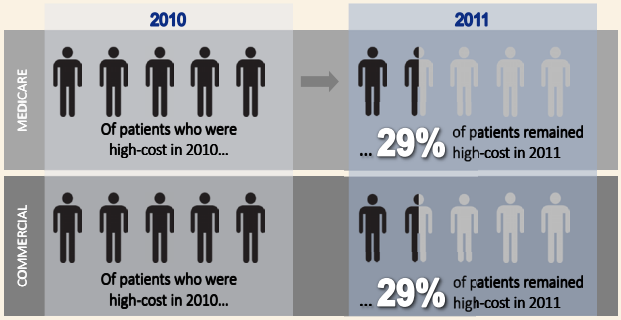
[ii] The sample was limited to patients who had at least six months of enrollment in both 2010 and 2011 and costs of at least $1 in each year. Figures do not capture pharmacy costs, payments outside the claims system, Medicare cost-sharing, or end-of-life care for patients who died in 2010 or 2011.

4.2 Persistence of spending among high-cost patients

Among the Medicare and commercial populations, 29 percent of 2010 high-cost patients remained high-cost in 2011 and therefore were persistently high-cost patients (**Figure 4.1**). National all-payer results show a similar proportion of persistently high-cost patients.[3]

Figure 4.1: Persistence among high-cost Medicare and commercial patients in Massachusetts

Claims-based medical expenditures (excludes pharmacy spending) in 2010 and 2011



SOURCE: All-Payer Claims Database; HPC analysis

Persistently high-cost patients also spent more than other high-cost patients during the same time period. On average, spending for Medicare persistently high-cost patients was 1.3 times greater than for Medicare non-persistently high-cost patients in 2010. Similarly, spending for commercial persistently high-cost patients was 1.8 times greater than for commercial non-persistently high-cost patients.

4.3 Characteristics and predictors of high-cost and persistently high-cost patients

To better understand high-cost and persistently high-cost patients, we examined three sets of patient characteristics: clinical conditions, region of residence, and demographics such as age, gender and income.[iii] First, we analyzed characteristics and predictors of high-cost patients, and then conducted similar analyses of persistently high costs, limiting the sample to high-cost patients in the base year. Using the APCD, we conducted two types of analyses:

- Descriptive analyses, which examined the relationship between one patient characteristic (such as a condition or region) and one spending variable (such as cost). This provides a profile of high-cost patients while highlighting characteristics that may be highly relevant from a clinical or policy point-of-view.
- Predictive analyses, which examined the impact of a series of patient characteristics on the likelihood of being either a high-cost or persistently high-cost patient and which used statistical techniques to isolate the impact of each characteristic while controlling for the impacts of the others. This aids in more precisely identifying patient characteristics for attention and the underlying drivers of high costs.
- Descriptive and predictive analyses may yield different but complementary results. For example, the descriptive analysis might indicate that spending is high in a particular region. The predictive analysis would suggest whether the difference was driven by different rates of chronic conditions in the region, higher spending in the region controlling for clinical conditions, or a combination of both factors.

4.3.1 Clinical conditions

Characteristics of high-cost and persistently high-cost patients

Certain clinical conditions are more likely to be prevalent among high-cost patients.[4] In Massachusetts in 2010, 13 conditions occurred at least four times more often among commercial high-cost patients than the rest of the commercial population (**Table 4.2**).[iv] In addition, there were several conditions which did not meet this threshold, but are nonetheless of interest because are highly prevalent and slightly more common among high-cost patients, including chronic medical conditions such as arthritis, asthma, and diabetes. Among the Medicare population, many of the same clinical conditions occurred more frequently among the high-cost population, though the differences were less pronounced.[v]

Furthermore, high-cost patients are frequently charac-

[iii] Patient income is not directly available in the APCD. We used median household income in a patient's zip code of residence as a proxy for individual income.

[iv] We used Lewin Group's Episode Risk Groups (ERG) tool to define clinical conditions. ERGs are risk measures based on observed episodes of care and demographic measures. Under optimal conditions, such measures incorporate pharmacy data, but certain constraints prevented the utilization of this data. We selected 23 clinical conditions to present in the text, emphasizing common chronic conditions and conditions particularly prevalent among high-cost patients.

[v] This more limited effect is expected. Medicare beneficiaries on average have higher spending levels, including a higher threshold for entering the top five percent. For example, a patient with $30,000 in spending related to a single high-cost condition would be in the top five percent in the commercial population, but not in the Medicare population.

Table 4.2: Prevalence of selected clinical conditions*

Percent of population; ratio of prevalence between high-cost patients and the rest of the population, 2010

	Medicare		Commercial	
	Overall prevalence	Prevalence among high-cost	Overall prevalence	Prevalence among high-cost
Arthritis	28%	1.6x	10%	3.0x
Asthma	13%	2.1x	7%	1.9x
Cardiology	21%	2.1x	7%	3.3x
Diabetes	23%	1.7x	5%	2.7x
Endocrinology	12%	4.0x	5%	4.3x
Hematology	9%	3.3x	3%	4.1x
Hepatology	4%	3.3x	2%	5.6x
High-cost cardiology	21%	3.0x	2%	7.4x
High-cost gastroenterology	8%	4.7x	3%	6.7x
High-cost pulmonary conditions	4%	9.8x	0%	21.2x
Hyperlipidemia	24%	0.6x	10%	1.2x
Hypertension	45%	0.7x	14%	1.9x
Infectious diseases	2%	14.2x	0%	17.5x
Malignant neoplasms (cancer)	11%	1.9x	3%	7.6x
Mental health	14%	2.6x	7%	2.1x
Mood disorders	9%	3.4x	2%	5.4x
MS & ALS	1%	2.6x	0%	5.5x
Neoplastic blood diseases and leukemia	2%	4.4x	0%	12.4x
Neurology	21%	2.8x	6%	3.7x
Poisoning and toxic drug effects	3%	5.8x	2%	3.6x
Renal Failures	8%	5.7x	1%	11.5x
Substance Abuse	5%	2.2x	3%	3.2x
Urology	7%	5.2x	2%	5.8x

* Clinical conditions as defined by Lewin's ERG grouper. 23 clinical conditions selected for presentation include common chronic conditions and conditions particularly prevalent among high-cost patients.

SOURCE: All-Payer Claims Database; HPC analysis

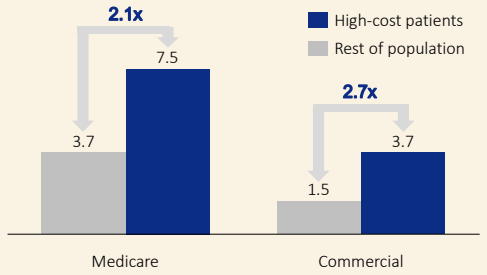
terized by multiple clinical conditions.[1,5] Among the Medicare and commercial populations in Massachusetts, high-cost patients had twice as many clinical conditions as the rest of the population (**Figure 4.2**).

Examining multiple conditions is important because the interactions among the conditions increase the complexity and cost of care.[6] In particular, patients with both behavioral health and additional medical conditions have health care needs that may require care from multiple providers within an often fragmented delivery system.

To better understand the interaction effects, we examined patients with both a behavioral health and at least one chronic medical condition. Among the Medicare and commercial populations, high-cost patients were twice as likely to have

Figure 4.2: Prevalence of multiple conditions among Medicare and commercial populations

Number of clinical conditions*, 2010

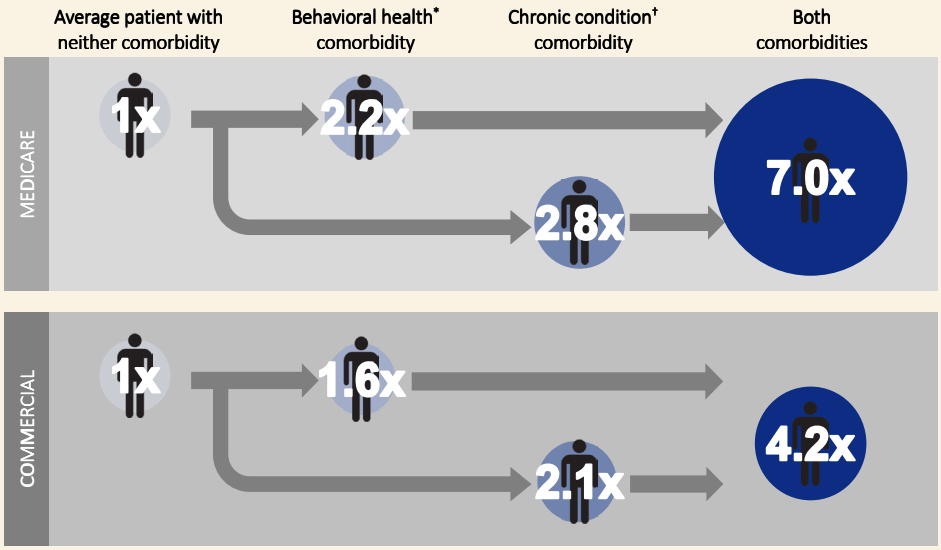


* Clinical conditions as defined by Lewin's ERG grouper. 23 clinical conditions selected to include common chronic conditions and conditions particularly prevalent among high-cost patients.

SOURCE: All-Payer Claims Database; HPC analysis

Figure 4.3: Average spending per patient based on behavioral health and chronic condition comorbidities

Claims-based medical expenditures (excludes pharmacy spending) relative to average patient with no behavioral health or chronic condition comorbidity in 2010



*Behavioral health comorbidity includes child psychology, severe and persistent mental illness, mental health, psychiatry, and substance abuse.

† Chronic condition includes arthritis, epilepsy, glaucoma, hemophilia, sickle-cell anemia, heart disease, HIV/AIDS, hyperlipidemia, hypertension, multiple sclerosis, renal, asthma, and diabetes.

SOURCE: All-Payer Claims Database; HPC analysis

a both a behavioral health and a chronic medical condition as the rest of the population. Comparing spending levels, the simultaneous presence of a behavioral health and a chronic medical condition was associated with an increase in spending beyond the simple combination of the two conditions' independent effects (**Figure 4.3**).[vi] This increase in spending indicates the enhanced complexity that occurs when dealing with multiple, interacting conditions.[vii,7]

Predictors of being high-cost and persistently high-cost patients

There were 13 clinical conditions that more than doubled the likelihood of being high-cost in the Medicare population, and 17 conditions that had this large of an effect in the commercial population (**Table 4.3**).[viii] These clinical conditions include some with relatively high prevalence rates, such as arthritis and cardiology, and others with low prevalence rates, such as leukemia and cancer.

Moreover, the presence of multiple conditions increased the likelihood of being high-cost even beyond the combined effects of the individual conditions. For example, the chances that a Medicare patient with both a behavioral health and a chronic medical condition was high-cost were 50 percent greater than would be predicted by the simple combination of the individual conditions.

While the effects were more muted, many of the same conditions that predicted a patient being high-cost in the current year also raised the likelihood that the patient would be high-cost in the next year.

Other than cancers and multiple sclerosis among the commercial population, no single clinical condition doubled the likelihood of being a persistently high-cost patient. However, combinations of conditions were powerful predictors of persistence. For example, for a commercial high-cost patient with three or more clinical conditions, the likelihood of being persistently high-cost was 1.4 times greater than would be expected based on a simple combination of the individual effects.

4.3.2 Region of residence

Location of high-cost and persistently high-cost patients

Descriptive analysis of concentration of high-cost patients by patient residence showed modest differences by region among both the Medicare and commercial popula-

[vi] For example, among the Medicare population, a patient with only a behavioral health condition spent 2.2 times the average spending for a patient with no comorbidities, and a patient with only a chronic medical condition 2.8 times. The combination of these would suggest a 2.2 x 2.8 = 6.2 factor for increased spending for those with both types of conditions if there were no interactions among the conditions. Due to interactions, though, patients with both types of conditions had 7.0 times the average spending of patients with neither type of condition.

[vii] This claims-based analysis describes the impact on patients who have been identified and treated for both a behavioral health and a chronic medical condition. In addition, studies have shown that untreated behavioral health disorders lead to complications for physical health care issues and also result in higher spending. Moreover, individuals with serious behavioral health issues live, on average, 25 years less than individuals without behavioral health issues in part due to untreated medical physical medical conditions. The effect of the interacting conditions in these circumstances is not captured by our analysis.

[viii] Results control for age, sex, region of residence, income, other clinical conditions, and interactions among conditions.

Table 4.3: Effect of selected clinical conditions on the likelihood of being high-cost and persistent*

Odds ratio, 2010

Clinical conditions in 2010	High-cost in 2010		Persistent in 2011†	
	Medicare	Commercial	Medicare	Commercial
Arthritis	1.2x	2.5x	1.0x	1.2x
Asthma	1.3x	1.6x	1.3x	1.2x
Cardiology	1.7x	2.6x	1.1x	1.1x
Diabetes	1.2x	1.3x	1.2x	1.2x
Endocrinology	2.2x	2.3x	1.2x	1.2x
Hematology	2.1x	2.3x	1.4x	1.1x
Hepatology	1.6x	3.4x	1.1x	1.0x
High-cost cardiology	4.2x	7.3x	1.1x	1.3x
High-cost gastroenterology	2.1x	4.9x	1.0x	1.5x
High-cost pulmonary conditions	3.1x	5.4x	1.1x	1.3x
Hyperlipidemia	0.7x	0.8x	0.7x	0.8x
Hypertension	1.3x	1.8x	0.9x	1.0x
Infectious diseases	2.9x	4.4x	1.2x	1.6x
Malignant neoplasms (cancer)	2.1x	8.6x	1.2x	2.2x
Mental health	1.6x	1.8x	1.1x	1.2x
Mood disorders	2.3x	3.3x	1.1x	1.4x
MS & ALS	2.2x	4.0x	1.6x	3.1x
Neoplastic blood diseases and leukemia	4.2x	8.8x	1.8x	3.1x
Neurology	2.2x	2.4x	1.1x	1.3x
Poisoning and toxic drug effects	2.5x	2.6x	1.3x	1.3x
Renal Failures	2.7x	2.6x	1.8x	1.8x
Substance Abuse	1.2x	1.9x	1.2x	1.3x
Urology	1.6x	3.0x	1.0x	1.1x

* Clinical conditions as defined by Lewin's ERG grouper. 23 clinical conditions selected to include common chronic conditions and conditions particularly prevalent among high-cost patients.

† Of patients who were high-cost in 2010.

SOURCE: All-Payer Claims Database; HPC analysis

tions (**Figures 4.4, 4.5**).[ix,x] Regional patterns in concentration differ between the Medicare and commercial populations with one exception: Pioneer Valley/Franklin had a consistently low concentration of high-cost patients. Such differences may be due to patients' clinical characteristics (for example, condition prevalence), patients' social characteristics (for example, education), or health system characteristics (for example, high-price providers or practice variation). Similar regional patterns emerge for persistently high-cost patients (**Figures 4.6, 4.7**).

Predictors of being high-cost and persistently high-cost patients

In the predictive analysis, region of residence affected the likelihood of being high-cost.[xi] Among the Medicare population, Pioneer Valley/Franklin was the one region with a significantly lower likelihood of being high-cost (**Table 4.4**). Among the commercial population, patients residing in the Berkshires or on the Cape and Islands were more likely to be high-cost patients. Additional investigation is needed to determine if these regional patterns are

[ix] The maps showing regional concentration are adjusted for age and sex, but not clinical conditions.

[x] For further information on how regions were defined, see Technical Appendix B3: Regions of Massachusetts.

[xi] Pioneer Valley/Franklin was selected as the control region because the region has the lowest mean expenditures among the Medicare and commercial populations. Results control for clinical conditions, interactions among conditions, age, sex, and income.

Figure 4.4: Concentration of commercial high-cost patients
Percent difference between region and statewide average, adjusted for age and sex

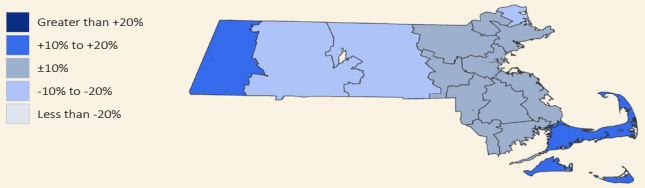


Figure 4.6: Concentration of commercial persistent high-cost patients
Percent difference between region and statewide average, adjusted for age and sex

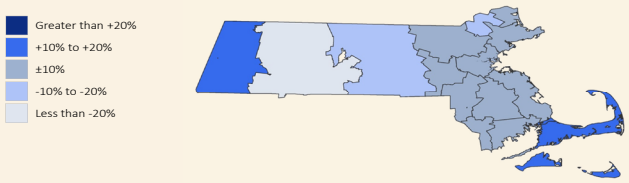


Figure 4.5: Concentration of Medicare high-cost patients
Percent difference between region and statewide average, adjusted for age and sex

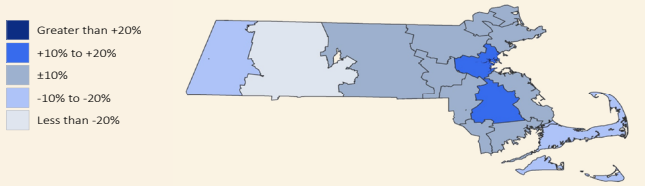
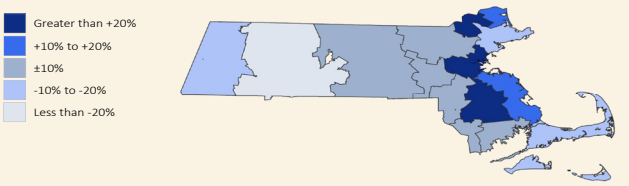


Figure 4.7: Concentration of Medicare persistent high-cost patients
Percent difference between region and statewide average, adjusted for age and sex



SOURCE: All-Payer Claims Database; HPC analysis

Table 4.4: Effect of patient residence on likelihood of being high-cost and persistent
Odds ratio relative to Pioneer Valley / Franklin

	High-cost in 2010		Persistent in 2011†	
Region of residence*	Medicare	Commercial	Medicare	Commercial
Berkshires	1.4x	1.6x	1.2x	1.1x
Cape and Islands	1.4x	1.6x	1.5x	1.2x
Central Massachusetts	1.3x	1.1x	1.4x	1.2x
East Merrimack	1.4x	1.2x	1.5x	1.2x
Fall River	1.2x	1.1x	1.5x	1.2x
Lower North Shore	1.2x	1.4x	1.4x	1.2x
Metro Boston	1.5x	1.3x	1.7x	1.2x
Metro South	1.5x	1.1x	1.6x	1.1x
Metro West	1.2x	1.2x	1.6x	1.2x
New Bedford	1.3x	1.1x	1.4x	1.1x
Norwood / Attleboro	1.4x	1.2x	1.6x	1.2x
Pioneer Valley / Franklin	1.0x	1.0x	1.0x	1.0x
South Shore	1.4x	1.2x	1.5x	1.1x
Upper North Shore	1.3x	1.1x	1.5x	1.2x
West Merrimack / Middlesex	**1.3x**	**1.1x**	**1.5x**	**1.2x**

* Regions as defined in Technical Appendix B3: Regions of Massachusetts
† Of patients who were high-cost in 2010.
SOURCE: All-Payer Claims Database; HPC analysis

driven by differences in health status (beyond the clinical conditions measured), provider mix, or other factors.

4.3.3 Demographic characteristics

Characteristics of high-cost and persistently high-cost patients

On average, high-cost commercial patients were eight years older than other commercial patients. A greater proportion of these patients were female. Among the Medicare population, the differences in age and sex were much less pronounced for high-cost patients. Age and sex did not differ materially between persistently and non-persistently high-cost patients for either payer type.

Income appeared to be a significant factor among the Medicare and commercial population, for which a relatively high concentration of high-cost and persistently high-cost patients lived in lower income communities (**Table 4.5**). Among the Medicare population, there was not a consistent pattern.

Table 4.5: Concentration of high-cost and persistently high-cost patients by income group

Percent difference from statewide average

Community income*	High-cost in 2010		Persistent in 2011†	
	Medicare	Commercial	Medicare	Commercial
Less than $35,000	3.4%	-0.7%	13.7%	0.6%
$35,000 to $50,000	9.5%	5.4%	21.6%	4.2%
$50,000 to $75,000	-0.6%	3.1%	-2.9%	4.2%
$75,000 to $100,000	-1.5%	-1.2%	-5.5%	-1.9%
Greater than $100,000	-7.2%	-7.0%	-12.9%	-7.8%

* Patient income is not directly available in the APCD. We used median household income in a patient's zip code of residence as a proxy for individual income.

† Of patients who were high-cost in 2010.

SOURCE: All-Payer Claims Database; HPC analysis

Predictors of being high-cost and persistently high-cost patients

The predictive analysis confirmed that among the commercial population, residing in a higher-income community was associated with a lower probability of being high-cost. No systematic relationship was found between community income and being a persistently high-cost patient.[xii] Among the Medicare population, residing in a high-income (top-quartile) community did increase the relative probability both of high costs and persistence, although there was no consistent pattern across other income levels. Additional investigation is needed to determine if these income patterns are driven by differences in health status (beyond the clinical conditions measured), provider mix, or other factors.

4.4 Interventions

Many providers and payers are engaged in efforts to improve the efficiency of care delivery for high-cost patients. We reviewed three types of strategies for reducing expenditures for high-cost patients: preventive strategies, process and operations improvement, and care management.

4.4.1 Preventive strategies

Preventive strategies seek to reduce the incidence of conditions that drive expensive health crises, as many ED visits and inpatient hospitalizations among high-cost patients are avoidable.[8] The most common conditions tied to preventable hospitalizations for this population are congestive heart failure, bacterial pneumonia, chronic obstructive pulmonary disease, and long-term diabetes complication.[4] In dealing with these types of conditions among high-cost patients, prevention initiatives that have proven effective include targeted, intensive lifestyle intervention, comprehensive medication management, and health coaching.[9]

Lifestyle intervention programs focused on diabetes and hypertension have been developed and implemented by a number of organizations and payers.[10,11] Such lifestyle management strategies can avert the development of high-cost and life-threatening cardiovascular conditions.

Comprehensive medication management is another preventive strategy, where a patient's medications are individually and collectively assessed to ensure that the medications are appropriate, effective, safe, and able to be taken by the patient as intended.[12] Poor medication management is estimated to cause approximately 32 percent of all hospitalizations and is a key driver of preventable adverse events, adding an estimated more than $200 billion each year in avoidable hospital spending.[13,14] Improved medication management has significant potential to reduce the frequency of high-cost, acute exacerbations of be-

[xii] Results control for clinical conditions, interactions among conditions, age, sex, and region of residence.

havioral health and chronic medical conditions.

Health coaching provides high-cost patients with the ability to understand their conditions and care plan, participate in shared decision-making with their providers, and take on more preventive, self-managed care. For patients, health coaching has led to significant improvement in functional status.[15]

4.4.2 Process and operations improvement

Preventive strategies may reduce, but not eliminate, the incidence of conditions that drive expenditures for high-cost patients. When an episode of care occurs, process and operations improvement aims to optimize the efficiency of the episode through sound operational practices and the adherence to evidence-based guidelines (for more information, see **Chapter 3).** For non-persistently high-cost patients, who often cannot be identified prospectively, the most promising interventions may be focused operational improvements that enhance the efficiency of care for the conditions most prevalent among this group.

One approach to improving efficiency is to standardize care for high-cost episodes. Standardization of inpatient care via checklists, more systematic applications of process engineering tools, and assuring consistent daily monitoring of ICU patients may reduce spending of high-cost episodes.[6] Some hospitals have adopted practices that enable structured reviews of process flows in order to reduce waste.[16] Alongside process standardization, the promotion and dispersion of information to support the practice of evidence-based medicine may improve quality and reduce costs (for more information, see **Chapter 2 and Chapter 3).**[8]

4.4.3 Care management

Care management and care coordination can reduce spending for high-cost and persistently high-cost. Uncoordinated care and social or environmental barriers to effective care lead to poor outcomes and spiraling costs for high-cost patients, many of whom require simultaneous treatment for multiple conditions.

Transitional care focuses on improving care transitions – such as when a patient is discharged from a hospital into a post-acute care setting – through better in-hospital planning and post–discharge follow-up. Such efforts target acute hospital and ED use and health status decline, emphasizing coordination and close clinical management among all involved parties.[17]

Care management activities can also play a role in better coordination of care for high-cost patients across multiple conditions. In CMS's Health Homes program, for example, provider organizations are responsible for better coordination of care for Medicaid beneficiaries with behavioral health and chronic medical conditions.[18]

In addition, other geographically targeted programs have focused on high-cost patients dealing with socioeconomic challenges.[5] This strategy, popularly referred to as "hot-spotting," often targets patient populations with interventions that convene providers and community groups to solve problems in a more holistic manner.

4.5 Conclusion

High-cost patients have clearly identifiable characteristics and predictable factors. While some of the factors driving high-costs are clinical, others are socioeconomic, such as education, and delivery system-related, such as fragmented care or high-priced providers. As a group, the high-cost patients are not homogenous – for example, persistently and non-persistently high-cost patients have distinct characteristics. In addition to persistence, other meaningful characteristics can be used to target interventions for particular segments of high-cost patients. The interventions needed to capture these savings and health outcome opportunities require strategic investment and coordinated action from providers and payers, as well as support from community organizations and government agencies. As with all interventions, it will be important to evaluate the return on such investments and to ensure that a portion of savings are passed along from payers and providers to purchasers and consumers. Reducing expenditures by 10 percent across the high-cost Medicare and commercial patients in Massachusetts would represent nearly $1.8 billion in annual savings.

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Conclusion

This report highlights key challenges and opportunities as the Commonwealth seeks to reduce the growth of health care spending. Although Massachusetts has seen a recent slowdown in per capita health care spending growth similar to national trends, maintaining this slower rate of growth will require a sustained commitment by all stakeholders to continue necessary reforms of the health care payment and delivery systems. Through our cost trends hearings and examination, the Commission supports this effort by reviewing significant drivers of spending growth, identifying areas of opportunity, and recommending evidence-based interventions, innovations, and policies. Our first annual cost trends report builds on prior work and has important implications for our ability to meet the goals of Chapter 224.

In summary, we find that there are significant opportunities in Massachusetts to enhance the value of health care, addressing cost and quality. We identify four primary areas of opportunity for improving the health care system in Massachusetts:

1. **Fostering a value-based market** in which payers and providers openly compete to provide services and in which consumers and employers have the appropriate information and incentives to make high-value choices for their care and coverage options,
2. **Promoting an efficient, high-quality health care delivery system** in which providers efficiently deliver coordinated, patient-centered, high-quality health care that integrates behavioral and physical health and produces better outcomes and improved health status,
3. **Advancing alternative payment methods** that support and equitably reward providers for delivering high-quality care while holding them accountable for slowing future health care spending increases, and
4. **Enhancing transparency and data availability** necessary for providers, payers, purchasers, and policymakers to successfully implement reforms and evaluate performance over time.

Our findings and recommendations are summarized below:

Meeting the benchmark

Understanding the complex factors that drive health care spending trends is important if Massachusetts is to meet its cost growth benchmark. Health care spending is a function of the amount and type of services provided (utilization) and the prices paid for health care services (price), which includes both the price per service (unit price), and the setting in which those services are provided (provider mix). We find:

- Per capita personal health care services spending in Massachusetts is the highest of any state in the U.S., crowding out other priorities for households, businesses, and government. This higher per capita spending is consistent across all payer types. Massachusetts residents use more services, especially hospital care and long-term care and home health, and are more likely to receive care at more expensive major teaching hospitals. Prices paid for health care services are higher in Massachusetts than the U.S. average.
- Over the past decade, growth in health care spending in Massachusetts exceeded the U.S. average and is driven primarily by growth in commercial prices, including both higher unit prices and a shift of patients to higher-priced providers. Commercial prices vary significantly in Massachusetts and are associated with the relative market position of the provider, not the quality of care provided.
- Massachusetts has better overall health care quality performance and offers better access to care than many other states. However, considerable opportunities remain to further improve quality and access as well as population health.

Fostering a value-based market

There is an opportunity in Massachusetts to improve health care market functioning by promoting value-based competition, increasing cost and quality transparency,

and encouraging both demand-side and supply-side approaches to drive health care value. We find:

- The provider market in Massachusetts is rapidly changing with many provider organizations exploring a range of potential affiliations, from corporate to contractual to clinical. These changes can significantly impact market functioning. It is important to balance potential cost and quality benefits of such transactions with potentially negative effects on patient access to care, prices and total spending, and the ability of payers to develop viable alternative network products. The Commission will continue to monitor these developments through its statutory authority to review provider material changes and conduct cost and market impact reviews.
- Payers have developed, and employers and consumers have increasingly selected, high-deductible and tiered or limited network products that provide greater financial incentives for consumers to make value-based health care decisions such as choosing high-quality, lower-priced providers and avoiding unnecessary services. While payers should continue to develop value-based products, it is important to monitor the impact of such products to ensure that specific product designs do not inhibit or otherwise discourage consumers from seeking necessary care.
- As required by Chapter 224, payers and providers are taking steps to make health care price information transparent and available to consumers. In order to further support value-based decisions, these transparency efforts should include comparable information on provider quality performance and patient experience.

Promoting an efficient, high-quality health care delivery system

There is an opportunity in Massachusetts for providers to more efficiently deliver coordinated, patient-centered, high-quality health care that integrates behavioral and physical health and produces better outcomes and improved health status. We find:

- Consistent with national findings, an estimated 21 to 39 percent ($14.7 to $26.9 billion in 2012) of annual health care spending in Massachusetts does not return value and in some cases causes preventable harm to patients. This "wasteful spending" includes spending on preventable ED visits, hospitalizations for ambulatory care-sensitive conditions, and unnecessary hospital readmissions, among other areas. Spending in these areas could be reduced by interventions such as more effective care coordination, adherence to evidence-based guidelines, and clinical process standardization. The Commission will continue to work with payers, providers and other stakeholders to identify and address these and other areas of wasteful spending.
- Consistent with national findings, a small number of patients account for a significant proportion of the Commonwealth's overall health care expenditures. In part due to ineffective coordination across a fragmented care delivery system, the interaction of multiple conditions can lead to even higher spending. There are opportunities to better identify and target interventions to improve health outcomes and reduce overall expenditures, especially for patients who are persistently "high-cost" or who have multiple conditions such as behavioral health and chronic medical conditions.
- Operating efficiency varies greatly from one hospital to another. Certain hospitals are able to achieve high levels of quality with lower operating expenses than other hospitals. Hospitals performing at lower efficiency should critically examine their cost structures and adopt best practices designed to improve their efficiency in delivering high-quality care.

Advancing alternative payment methods

All major payers in Massachusetts are implementing forms of alternative payment methods, such as global payments, which, in contrast to fee-for-service payments, are designed to support and financially reward providers for delivering high-quality care while holding them accountable for slowing future health care spending increases. We find:

- There is wide variation in the types of alternative payment contracts covering Massachusetts providers, both within and across payers, as budget levels, risk adjustments and other contract terms are negotiated. In addition, behavioral health services are often excluded from global budgets. As a result, underlying payment disparities persist, and providers face challenges managing patients' care under different incentive structures. The Commission will continue to evaluate the impact of alternative payment methods and encourage, where appropriate, the standardiza-

tion of such payment methods that responsibly foster high-quality care and the efficient use of resources.

- Commercial alternative payment contracts currently apply primarily to patients in HMO products. However, employers and consumers in Massachusetts are increasingly selecting PPO product offerings, which currently do not feature alternative payment contracts. Payers should accelerate the development of methodologies and address other barriers so that alternative payment methods can be extended to PPO products as well. The Commission will continue to monitor effective ways to coordinate patient care and incentives across multiple forms of product design.

Enhancing transparency and data availability

Readily available data are necessary for providers, payers, purchasers, and policymakers to successfully implement reforms and evaluate performance over time. We find:

- To effectively coordinate and manage care delivery, including better identifying needs of high-cost patients, providers need access to patient data, even when care is delivered by another provider or within a different health system. These data needs include both current patient data and retrospective information on relative performance. Payers should support providers by making this data more readily accessible for all patients in all product types. The Commission supports the continued development of a health information exchange and an accessible all-payer claims database as important efforts to enhance data accessibility.
- Analysis of hospital operating expenses is limited by variation in hospital cost reporting. There is a need for improved cost accounting at hospitals and increased standardization in the allocation of administrative costs and public reporting of all patient care expenses. An improved set of data should be collected by the Commonwealth, including through the current CHIA reporting process.
- As payers and providers achieve efficiencies through these reforms, the Commission will monitor the impact of these efforts to ensure that employers and consumers share in the savings in the form of lower growth in premiums and consumer out-of-pocket spending.

In the coming months we intend to update many of the analyses contained in this report with claims data from 2012, including Medicaid information. In addition, through our ongoing analysis of the APCD and other data sources, we intend to continue our analysis of issues that are critical to the success of the Commonwealth's cost containment and quality improvement efforts. We look forward to working with the Massachusetts health care industry, stakeholders, businesses, and consumers on advancing the goal of a more affordable, effective and accountable health care system in Massachusetts.

List of Technical Appendices

A1: Profile of Massachusetts
A2: Hospital Operating Expenses
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A4: High-Cost Patients
B1: Data Sources
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B3: Regions of Massachusetts
B4: Lewin Report to Commission

Glossary

Term	Definition
Accountable care organization (ACO)	A provider organization that receives reimbursements or compensation from alternative payment methodologies and provides or manages medically necessary services across the care continuum including behavioral and physical health services for a population of patients, with the aim of providing efficient, effective, and coordinated care.
All-Payer Claims Database (APCD)	A database maintained by the Center for Health Information and Analysis (CHIA) comprising medical, pharmacy, and dental claims, as well as information about member eligibility, benefit design, and providers for all payers covering Massachusetts residents.
Alternative Payment Methods (APMs)	Methods of payment that are not solely based on fee-for-service reimbursements, including shared savings arrangement, bundled payments and global payments.
Alternative Payment Contract	Any contract between a provider or provider organization and a health care payer which utilizes alternative payment methodologies.
Chapter 224	Chapter 224 of the Acts of 2012, "An Act Improving the Quality of Health Care and Reducing Costs through Increased Transparency," is a Massachusetts law that set the ambitious goal of bringing health care spending growth in line with growth in the state's overall economy. This built on previous cost containment efforts, including Chapter 305 of the Acts of 2008, "An Act to Promote Cost Containment, Transparency and Efficiency in the Delivery of Quality Health Care," and Chapter 288 of the Acts of 2010, "An Act to Promote Cost Containment, Transparency and Efficiency in the Provision of Quality Health Insurance for Individuals and Small Businesses."
Chapter 58	Chapter 58 of the Acts of 2006, "An Act Providing Access to Affordable, Quality, Accountable Health Care," is a Massachusetts law designed to provide universal health insurance coverage for Massachusetts residents through an expansion of Medicaid eligibility, enhanced government subsidies, and a health insurance exchange to help individuals and small businesses purchase commercial insurance.
Claims-based medical expenditures	Claims-based medical expenditures are a measure of spending calculated by the Commission in our analysis of the APCD. Health care claims are submitted by providers to payers in order to receive payment for services, and this transaction history represents a robust data set for analysis (for more information, including data limitations, see sidebar "What is the APCD and how do we use the data?").
Co-insurance	A percentage of the allowed charge, after a copayment, if any, that an insured will pay for covered services under a health benefit plan.
Community hospital	An acute hospital that is not designated a major teaching hospital.
Co-payment	A fixed dollar amount paid by an insured to a physician, hospital, pharmacy or other health care provider at the time the insured receives covered services.
Cost sharing	The total amount paid by an insured to a physician, hospital, pharmacy or other health care provider at the time the insured receives covered services, including co-insurance, co-pays, and deductibles.
Deductible	An annual dollar amount that must be paid by an insured for specified health care services that the insured uses before the health plan becomes obligated to pay for covered services. Some health plans may include separate prescription drug deductibles. The deductible amount does not include the premiums that the insured pays.
Disproportionate Share (DSH) hospital	Any acute hospital that exhibits a payer mix where a minimum of 63 percent of the acute hospital's gross patient service revenue is attributable to Title XVIII and Title XIX of the Federal Social Security Act [Medicare and Medicaid], other government payers, and free care.
Early elective induction	A delivery in which labor is induced for a non-medical reason, such as convenience or preference, before 39 weeks of gestational age.
Fee-for-service (FFS)	A payment mechanism in which all reimbursable health care activity is described and categorized into discreet and separate units of service and each provider is separately reimbursed for each discrete service rendered to a patient.
Global payment	A payment arrangement where spending targets are established for a comprehensive set of health care services for the care that a defined population of patients may receive in a specified period of time.
Health care-associated infections	Infections contracted by patients while they are in a hospital receiving health care treatment for other conditions.
Health maintenance organizations (HMO)	A particular type of health insurance plan. In our analysis, we primarily distinguish between insurance products based on whether they require identification of a primary care provider. HMO and point-of-service (POS) product types require designation of a PCP, and our discussion of HMO products also applies to POS products.
Health insurance plan	The Medicare program or an individual or group contract or other plan providing coverage of health care services and which is issued by a health insurance company, a hospital service corporation, a medical service corporation or a health maintenance organization.
High deductible health plans (HDHP)	A health plan with a lower premium due to a higher deductible, which for our analysis is at least $1,000.
High-cost patient	The five percent of patients with the highest level of spending in claims-based medical expenditures in a given year. Higher spending may be due to greater medical complexity, higher utilization, and/or use of higher-priced providers (provider mix).

Glossary (con't)

Term	Definition
Hospital operating efficiency	A term describing how productively hospitals make use of their input resources, such as facilities, labor, and supplies, to deliver care. We describe a hospital that is able to deliver similar services at equivalent quality while incurring fewer operating expenses than another hospital as being relatively efficient.
Hospital operating expenses	The expenses incurred by acute hospitals associated with patient care activities.
Hospital readmission	An admission to an acute hospital within a defined period of time (often 30 days) of a discharge from the same or another acute hospital.
Lean operations	"Lean" management principles are most widely associated with the Toyota Production System, which seeks to reduce waste in the production process to increase value for the customer. Over the past decade, a number of organizations have translated the same lean principles to the hospital setting.
Limited network plans	A health insurance plan with a lower premium due to a reduced or selective provider network, which is smaller than a health plan's general provider network and from which the health plan may choose to exclude from participation other providers who participate in the health plan's general provider network.
Major teaching hospital	The Medicare Payment Advisory Commission (MedPAC) defines a major teaching hospital as having at least 25 full-time equivalent medical school residents per one hundred inpatient beds.
Net patient service revenue (NPSR)	Revenue a hospital would expect to collect for services provided less contractual allowances. NPSR is the primary source of revenue for a hospital.
Out-of-pocket spending	Includes direct spending by consumers for all health care goods and services, including coinsurance, deductibles, and any amounts not covered by insurance.
Payer	An insurer or health plan that provides some form of health care coverage to patients.
Payment Method	The structure than an insurer uses to reimburse health care providers. A variety of payment methodologies exists, such as fee-for-service, per-diem, and capitation.
Patient-centered medical home (PCMH)	A model of health care delivery designed to provide a patient with a single point of coordination for all their health care, including primary, specialty, post-acute and chronic care, which is (i) patient-centered; (ii) comprehensive, integrated and continuous; and (iii) delivered by a team of health care professionals to manage a patient's care, reduce fragmentation and improve patient outcomes.
Persistently high-cost patients	Patients who remain in the top five percent of patients by spending in claims-based expenditures in consecutive years.
Personal health care expenditures	Personal Health Care expenditures (PHC) measures the total amount spent to treat individuals with specific medical conditions.
Pioneer ACO	An initiative launched by the Center for Medicare & Medicaid Innovation (CMMI) to test a payment arrangement for ACOs that confers higher levels of shared savings and shared losses than previous Medicare ACO models. 32 provider organizations nationwide have been designated as Pioneer ACOs.
Preferred provider organizations (PPO)	A particular type of health insurance plan. In our analysis, we primarily distinguish between insurance products based on whether they require identification of a primary care provider. PPO and indemnity product types do not require designation of a PCP, and our discussion of PPO products also applies to indemnity products.
Price	A term used to refer to the 'allowed amount,' the contractually agreed upon amount paid by a payer to a health care provider for health care services provided to an insured. Price may also refer to aggregate amount paid by a population for services utilized, encompassing both unit price and provider mix.
Primary Care Provider (PCP)	A health care professional qualified to provide general medical care for common health care problems, who supervises, coordinates, prescribes or otherwise provides or proposes health care services, initiates referrals for specialist care and maintains continuity of care within the scope of practice.
Provider mix	The distribution of insurer members among the providers within an insurer's network.
Self-pay	Payments made by a consumer to a provider for services received outside of their insurance benefits. This type of payment is made when a commercial or public payer does not provide coverage for the services obtained.
Tiered network plans	A health insurance plan with a lower premium due to a structure for cost-sharing (copayment, coinsurance, or deductible) in which providers are tiered according to cost and quality and member cost sharing is based on the tier placement of the provider.
Total health care expenditures (THCE)	The annual per capita sum of all health care expenditures in the Commonwealth from public and private sources, including as defined in Chapter 224: (i) all categories of medical expenses and all non-claims related payments to providers, as included in the health status adjusted total medical expenses reported by CHIA; (ii) all patient cost-sharing amounts, such as deductibles and copayments; and (iii) the net cost of private health insurance.
Total medical expenses (TME)	The total cost of care for the patient population associated with a provider group based on allowed claims for all categories of medical expenses and all non-claims related payments to providers, expressed on a per member per month basis.
Unit price	The contractually negotiated amount (or reimbursement rate) that an insurer agrees to pay a particular hospital, physician, or other health care provider for a given health care service. This is the "price tag" that the insurer agrees it will pay each time one of its members incurs a covered expense.
Utilization	The amount or number of medical services or units of service used by a given population over a period of time.
Wasteful spending	Spending in the provision of health services that could be eliminated without harming consumers or reducing the quality of care people receive

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